



EXPLORING POLICY OPTIONS AND OPPORTUNITIES WITHIN THE COHESIVE STRATEGY: Draft Report of the National Science and Analysis Team

Presentation to the Wildland Fire Executive Council

June 25, 2013

Cohesive Strategy Focus Areas:

- Restore and maintain resilient landscapes
- Fire adapted communities
- Response to wildfire



Background on National Analysis

- Assignment: Explore various potential national policy options for achieving the national goals of the Cohesive Strategy
- Identify the trade-offs and risks inherent in each option
- Purpose: provide a broad strategic overview of the issues that could inform subsequent discussion and decision-making processes.
- For example, analysis can help inform choices among more detailed regional activities or suggest where actions could be focused across the nation.

Analytical Challenge

- Wildland Fire is a complex issue that involves many interacting factors and processes.
- The United States is a dynamic and diverse landscape, where no single characterization (or solution) is universally appropriate—too diverse for a “one size fits all” approach.
- Yet without some generalization, simplification, or consolidation, it’s not possible to create a cohesive strategy. Cannot have an “everyone for themselves” strategy.”

Meeting the Analytical Challenge

- Drawing from multiple data sets spanning the range of biophysical, social, and economic factors in addition to a comprehensive summary of wildland fire statistics.
- Exploring relationships and patterns using a mix of statistical and geospatial techniques.
- Match patterns with “policy options” to identify areas best suited for each option.
- Blend policy options spatially and institutionally to create a national strategy (role of the larger CS governance).

Framing the Issue

- Historical Perspective
 - Extensive area with relatively frequent wildland fires
 - Both natural ignitions and Native American cultural practices
 - Varying levels of frequency and severity characterized as Fire Regime Groups
- Natural versus Anthropogenic Fire Regimes
 - Human-caused ignitions account for majority of incidents
 - Spatial patterns in causes and consequences

Table 1. Historical natural fire regimes, with examples

| Fire regime group | Percent of wildland in this group ^a | Fire frequency ^b (years) | Fire severity ^c | Description/ definition | Examples |
|-------------------|--|-------------------------------------|----------------------------|--|---|
| I | 25 | 0–35 | Low to mixed | Low-severity fires that leave most dominant overstory ^d vegetation intact; can include mixed-severity fires replacing up to 75 percent of overstory | Lower elevation Ponderosa pine forests in the West; Pine and oak forests in the Southeast |
| II | 19 | 0–35 | High | High-severity fires that consume at least 75 percent of overstory vegetation | Grassland areas across the central United States; Chaparral stands throughout the West |
| III | 22 | 35–200 | Mixed to low | Generally mixed-severity fires; can also include low-severity fires | Mixed deciduous-conifer forests of the upper Midwest and Northeast; Western Douglas-fir forests |
| IV | 12 | 35–200+ | High | High-severity fires that consume or kill most of the aboveground vegetation | Lodgepole pine in the Northern Rockies; Isolated areas of the Great Lakes and New England regions |
| V | 16 | 200+ | Any severity | Infrequent fires that consume or kill most of the aboveground vegetation | Wetter forests in much of Maine, northern Pennsylvania, and parts of the West |

^a The column does not add up to 100 percent because 6 percent of all wildlands do not fall into any of these categories.

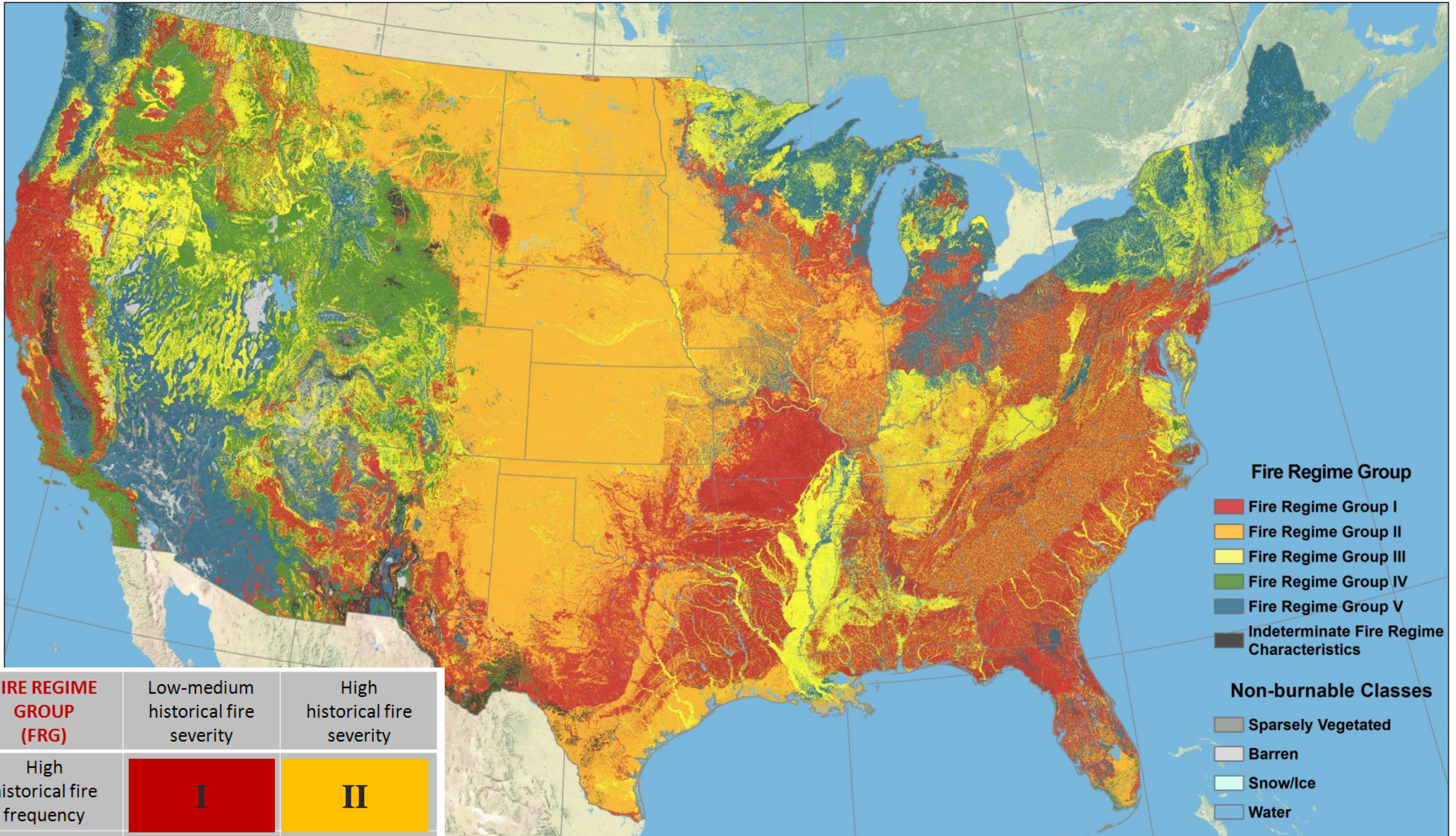
^b Historical average number of years between fires (prior to European settlement).

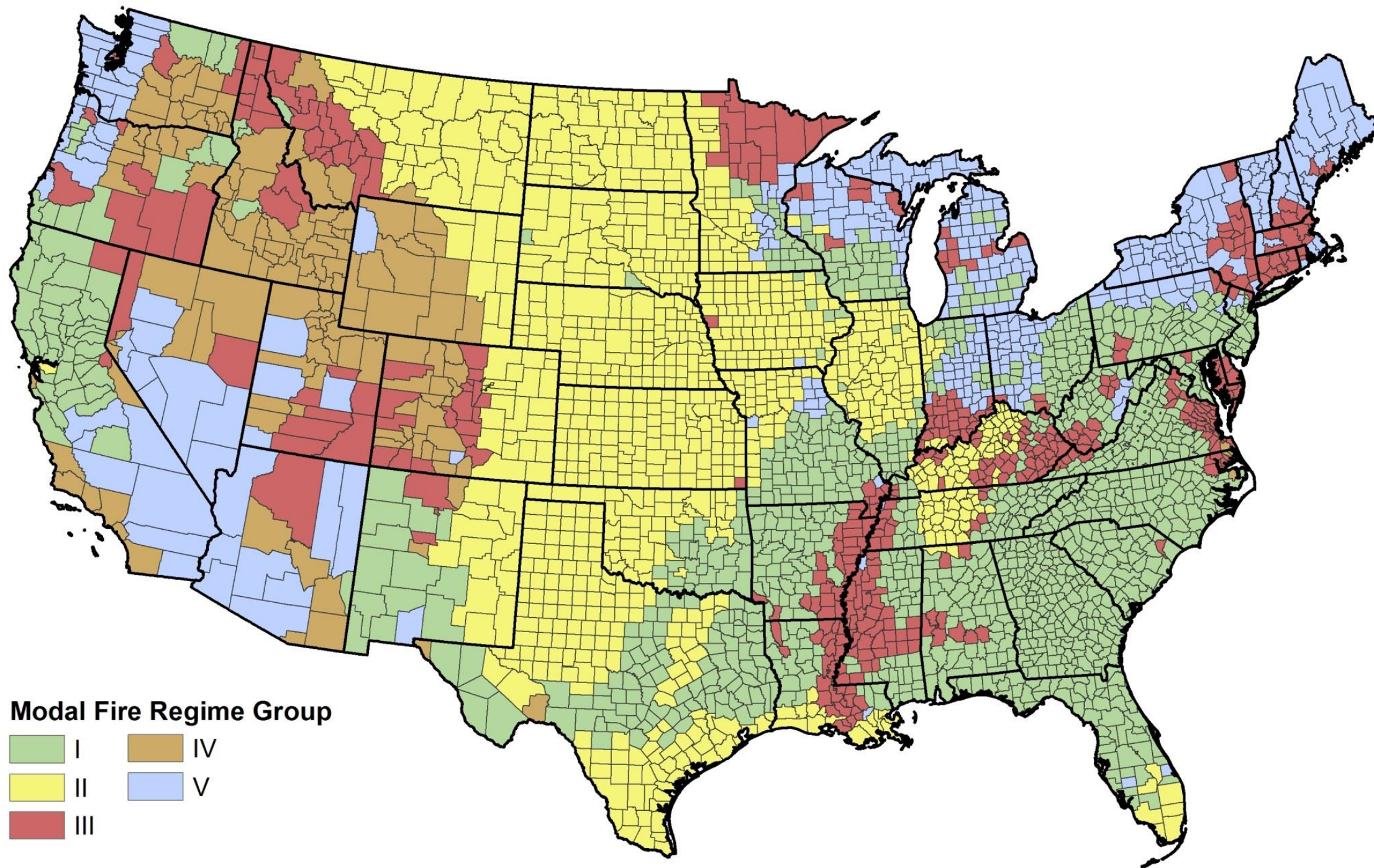
^c Historical effect on the trees and plants most commonly found in each wildland type (prior to European settlement).

^d The term overstory refers to all above-ground vegetation.

Sources: Barrett and others 2010, Brown 2000, Hardy and others 2001, Rieman and others 2005, Schmidt and others 2002, USDA Forest Service 2012.

LANDFIRE Fire Regime Groups



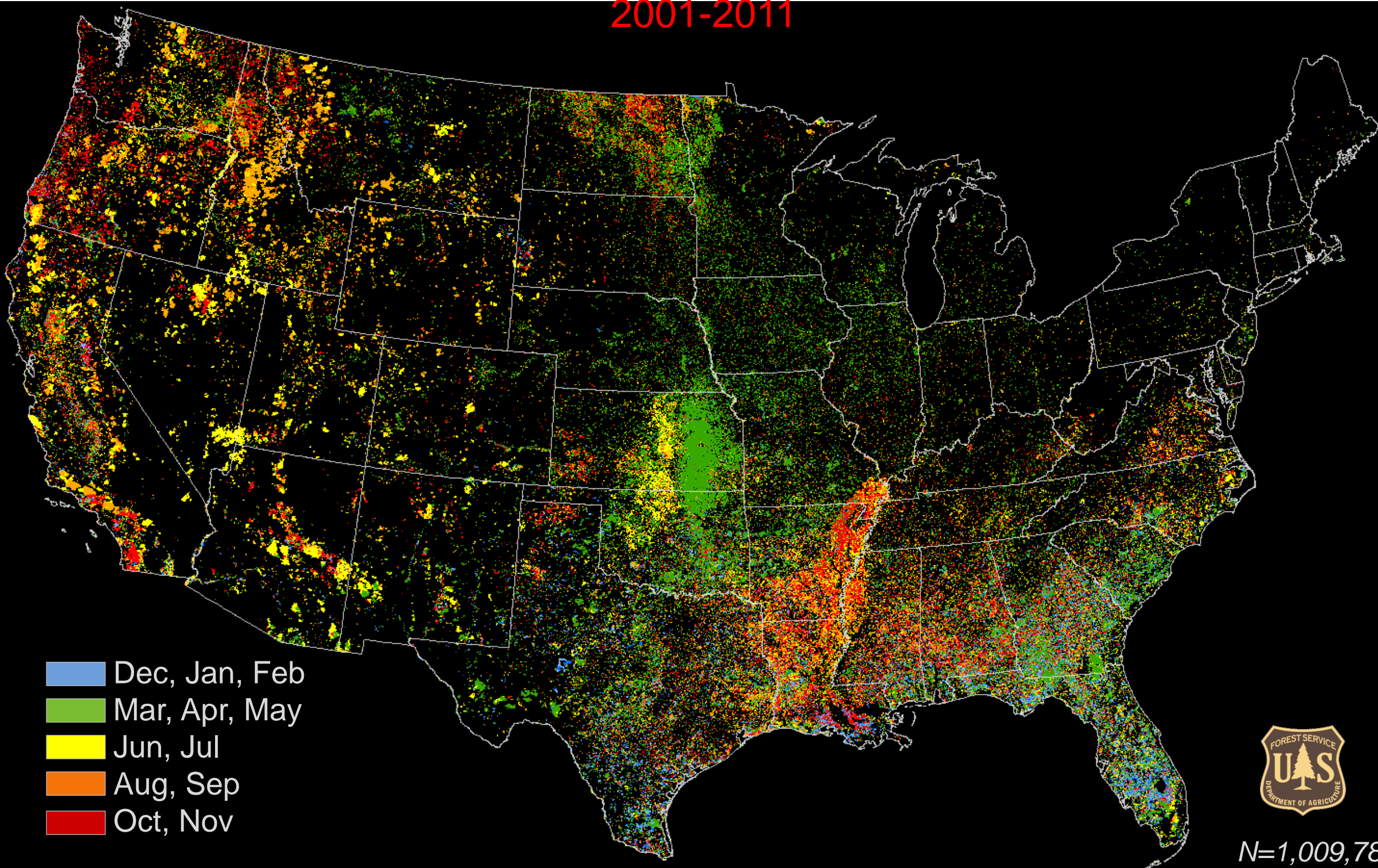


Modal Fire Regime Group

- I
- II
- III
- IV
- V

The seasonality of fire from space as inferred from MODIS hotspots

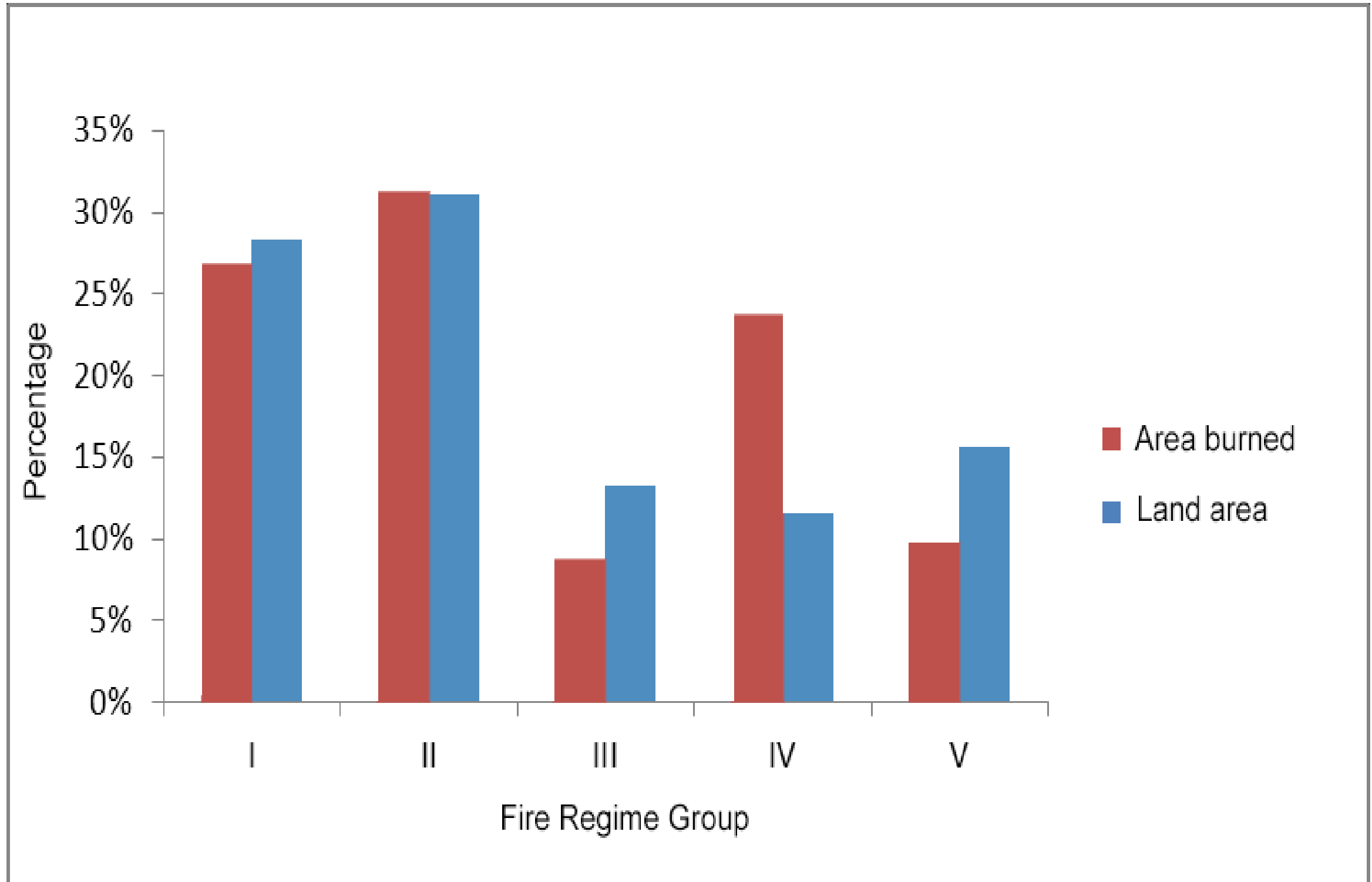
2001-2011



N=1,009,782

Steve Norman 5/2012

Relative Total Area and Area Burned within each Fire Regime Group



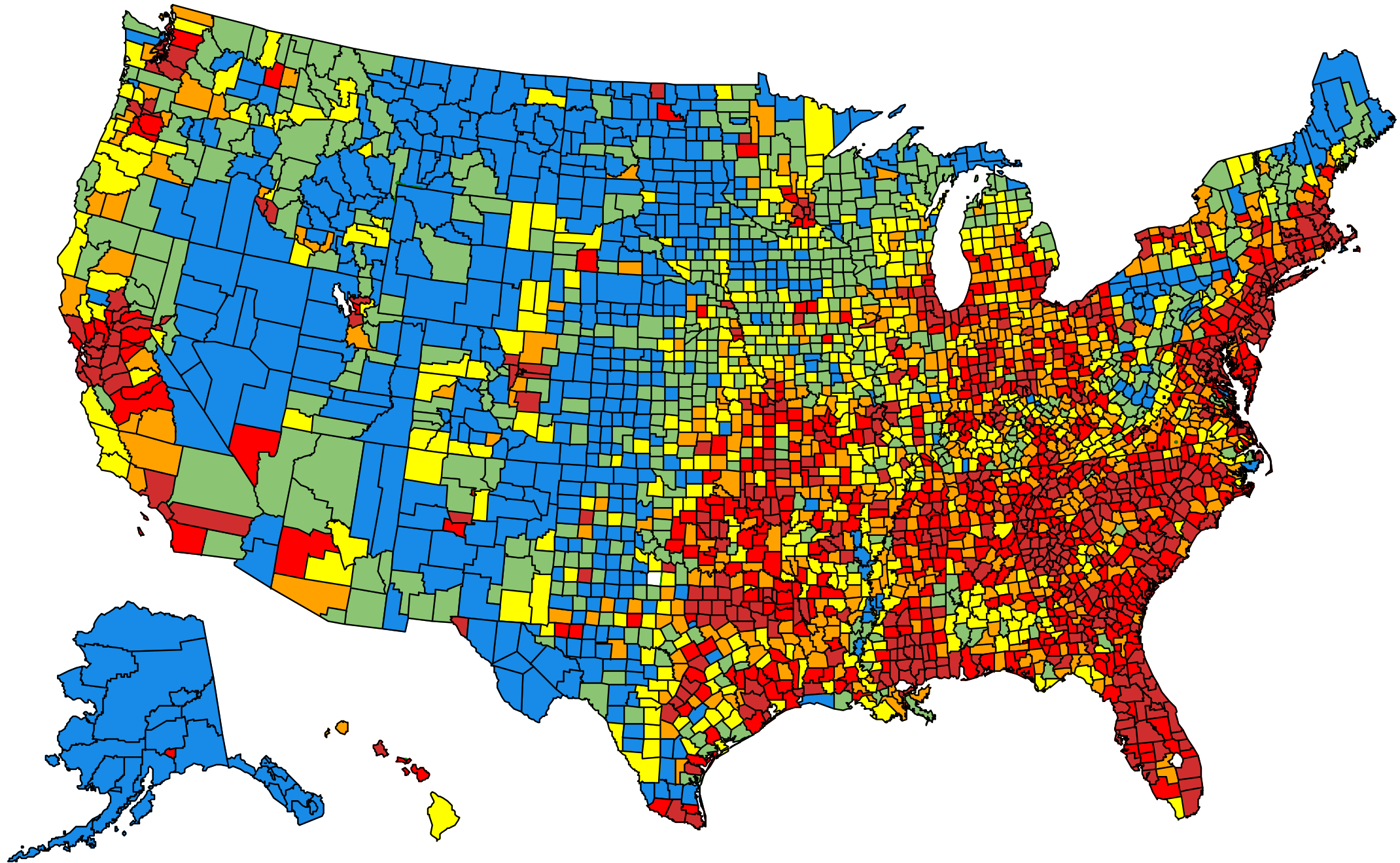
Foundational Data: Fire Occurrence and Extent

- Federal Fire Occurrence Data (FODfd)
 - Compiled for FPA
- National Association of State Foresters (NASF)
 - NASF data download, February 2013
 - Edited and patched by NSAT
- National Fire Information Recording System (NFIRS)
 - GIS cross-walk by NSAT
- Consolidated for Years 2002-2011

National Fire Occurrence Data - All Sources

Area-weighted Summaries

Ignition Density



Max Annual Incident Reports

0 - 5

17 - 27

5 - 10

27 - 48

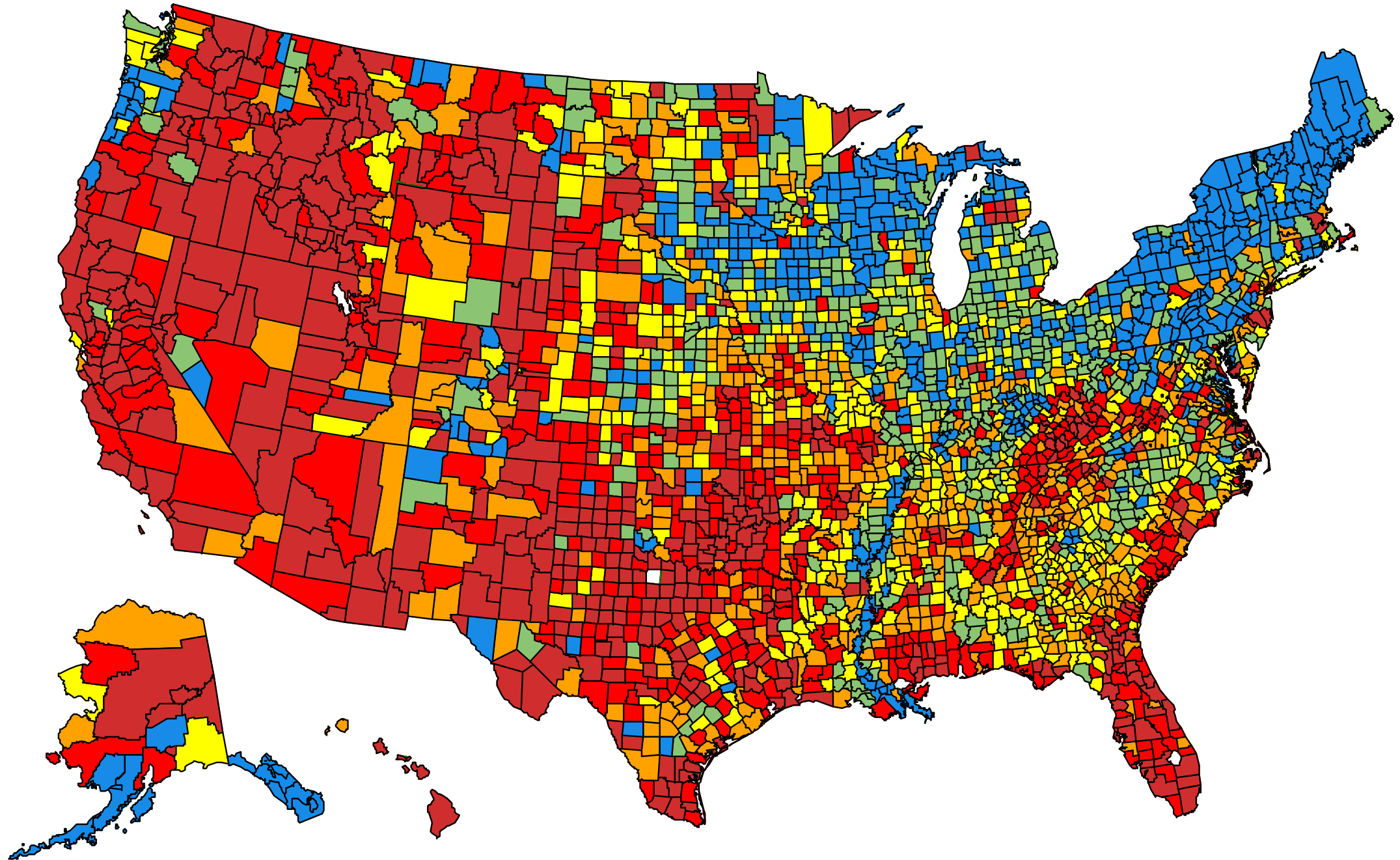
10 - 17

48 - 10,977

National Fire Occurrence Data - All Sources

Area-weighted Summaries

Normalized Area Burned



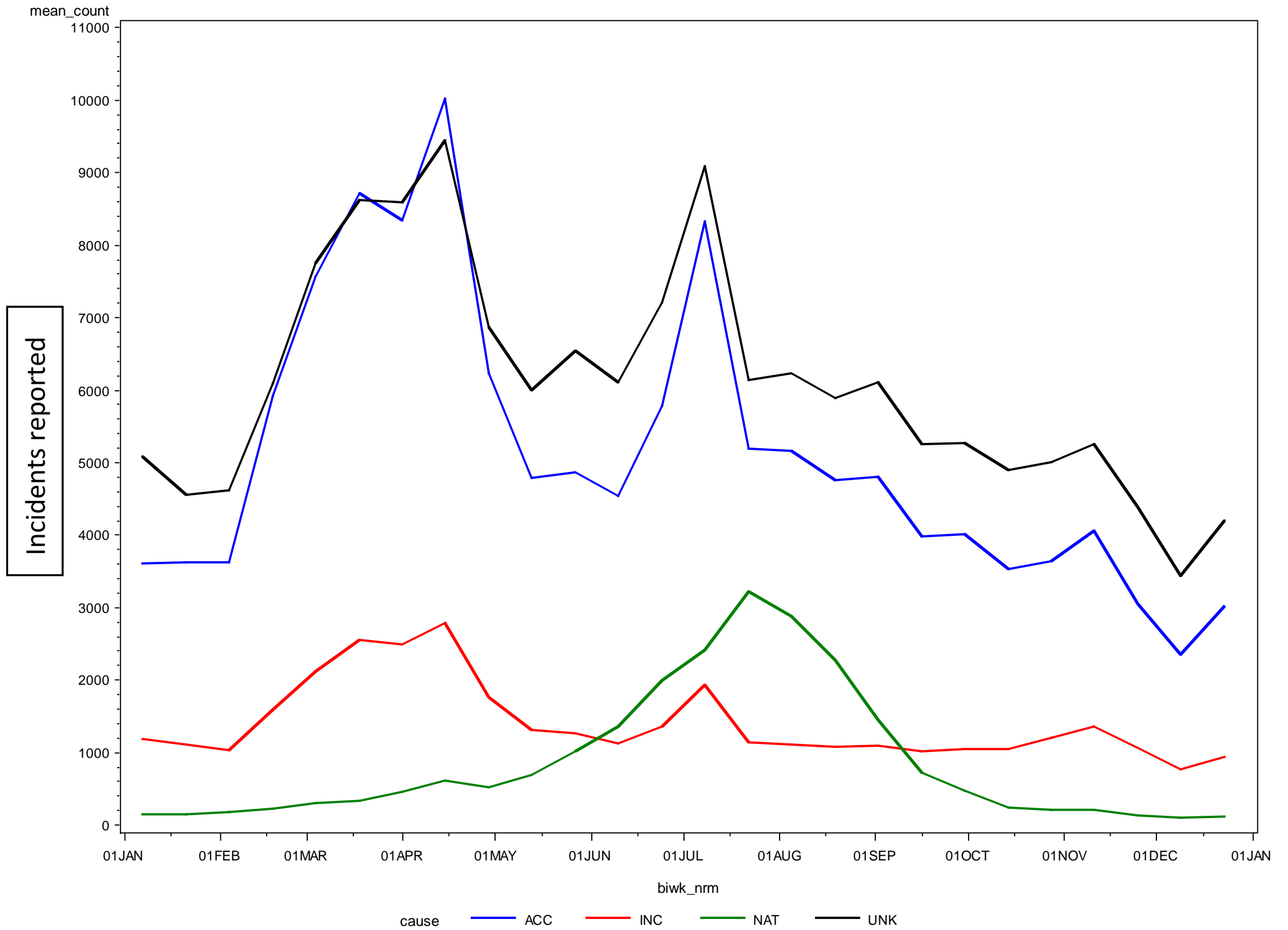
Max Area Burned Annually

0.01 - 41.50
170.26 - 354.22

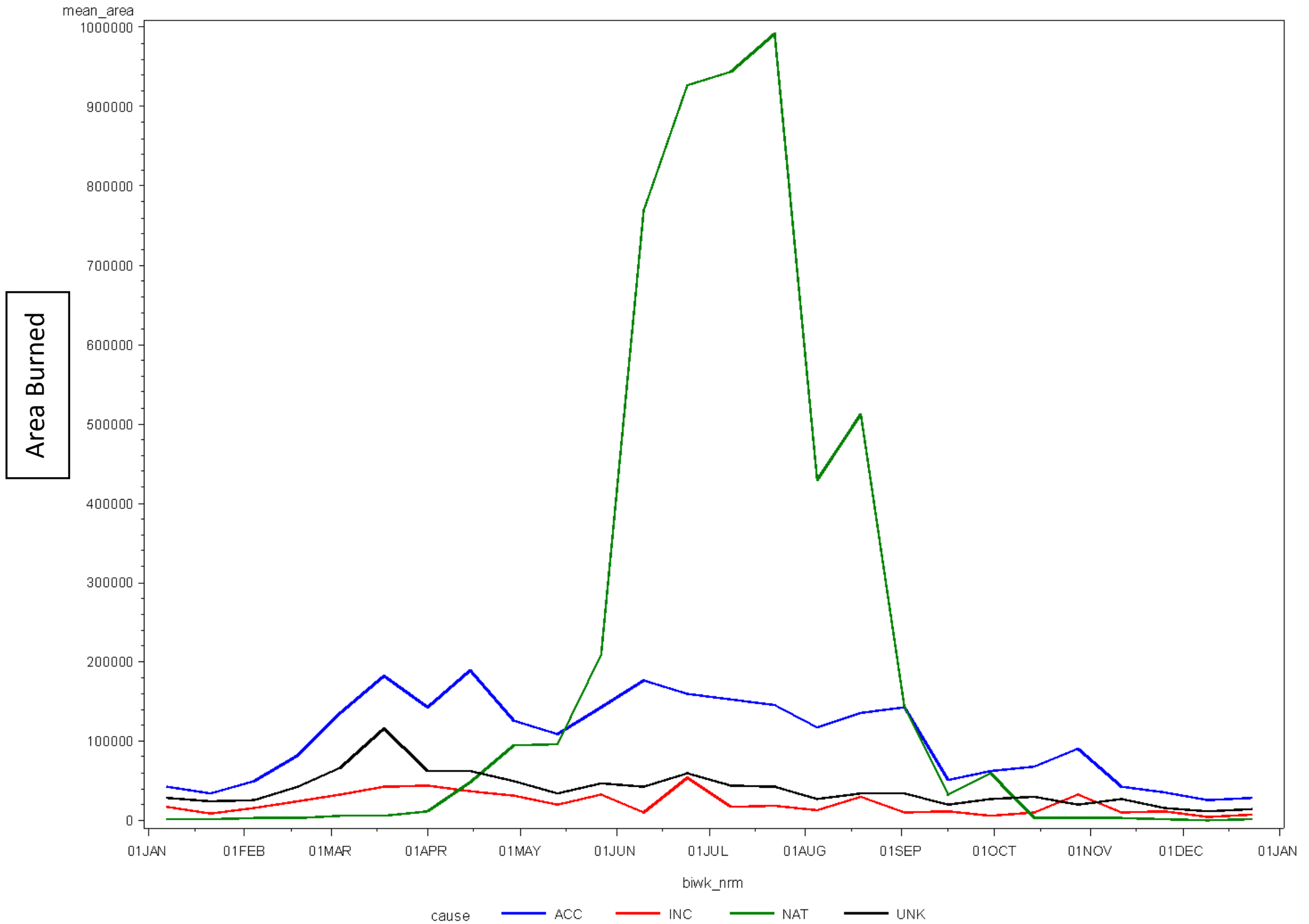
41.75 - 89.23
354.61 - 998.05

89.30 - 170.24
1,000.00 - 54,750.09

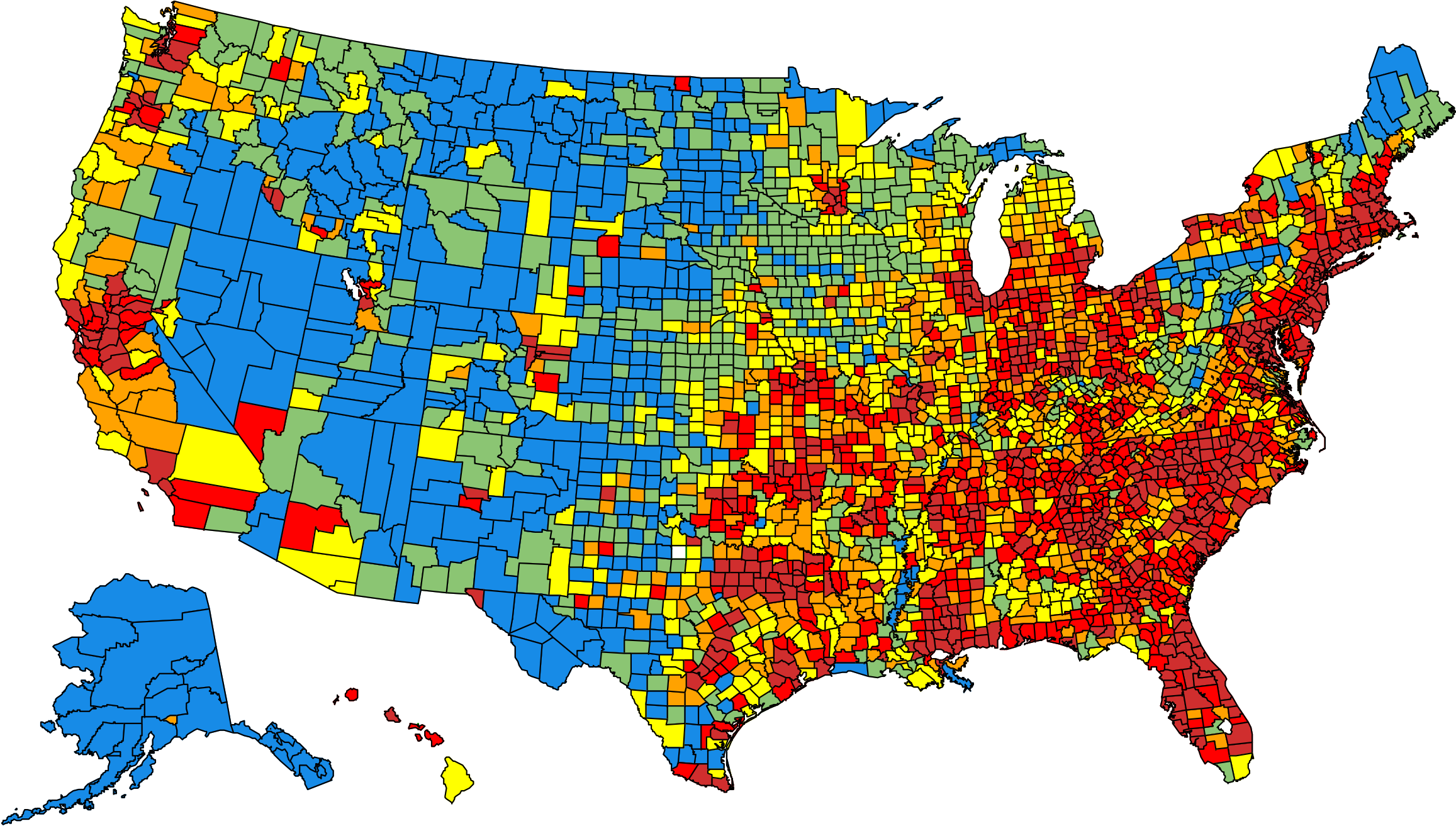
Mean Annual Patterns in Fire Reports



Mean Annual Patterns in Fire Reports



Density of Accidental Human-caused Ignitions



CMB_avg_rpts

0.00 - 1.43

1.43 - 3.83

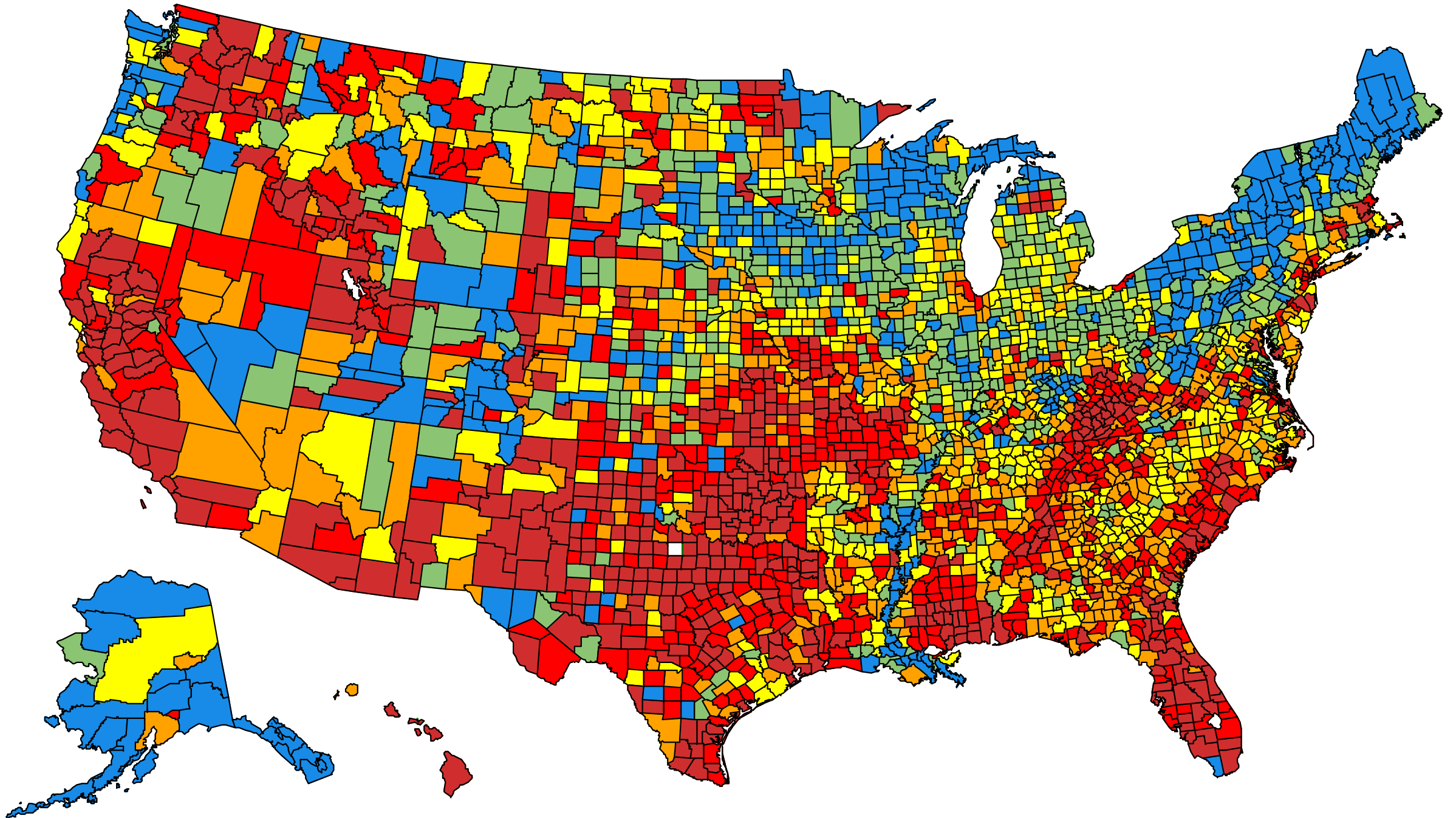
3.83 - 7.26

7.27 - 12.61

12.61 - 23.23

23.30 - 7,788.89

Normalized Area Burned from Accidental Ignitions



CMB_sum_brn

0.0 - 9.3

9.3 - 20.1

20.1 - 36.8

36.9 - 64.3

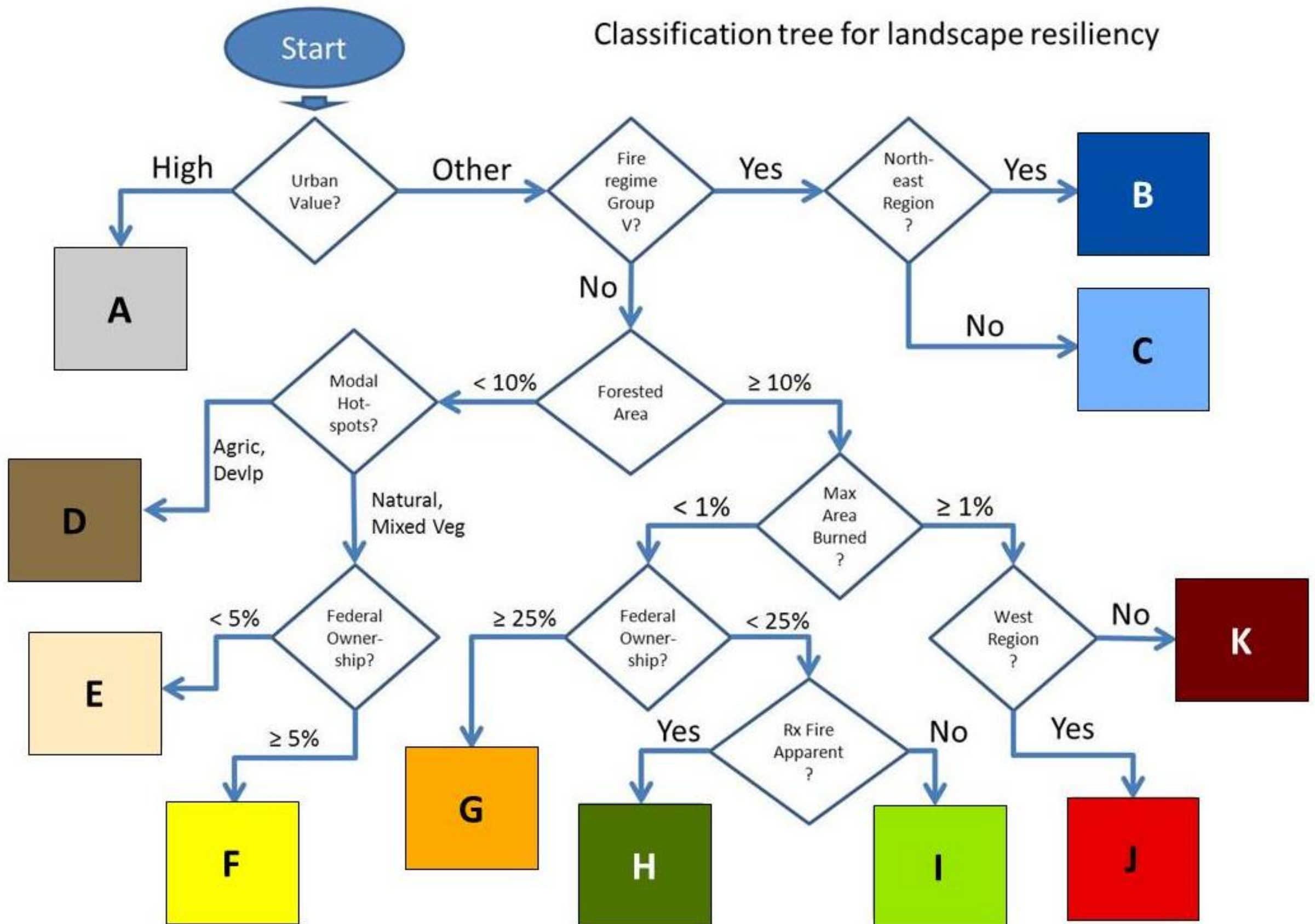
64.4 - 143.9

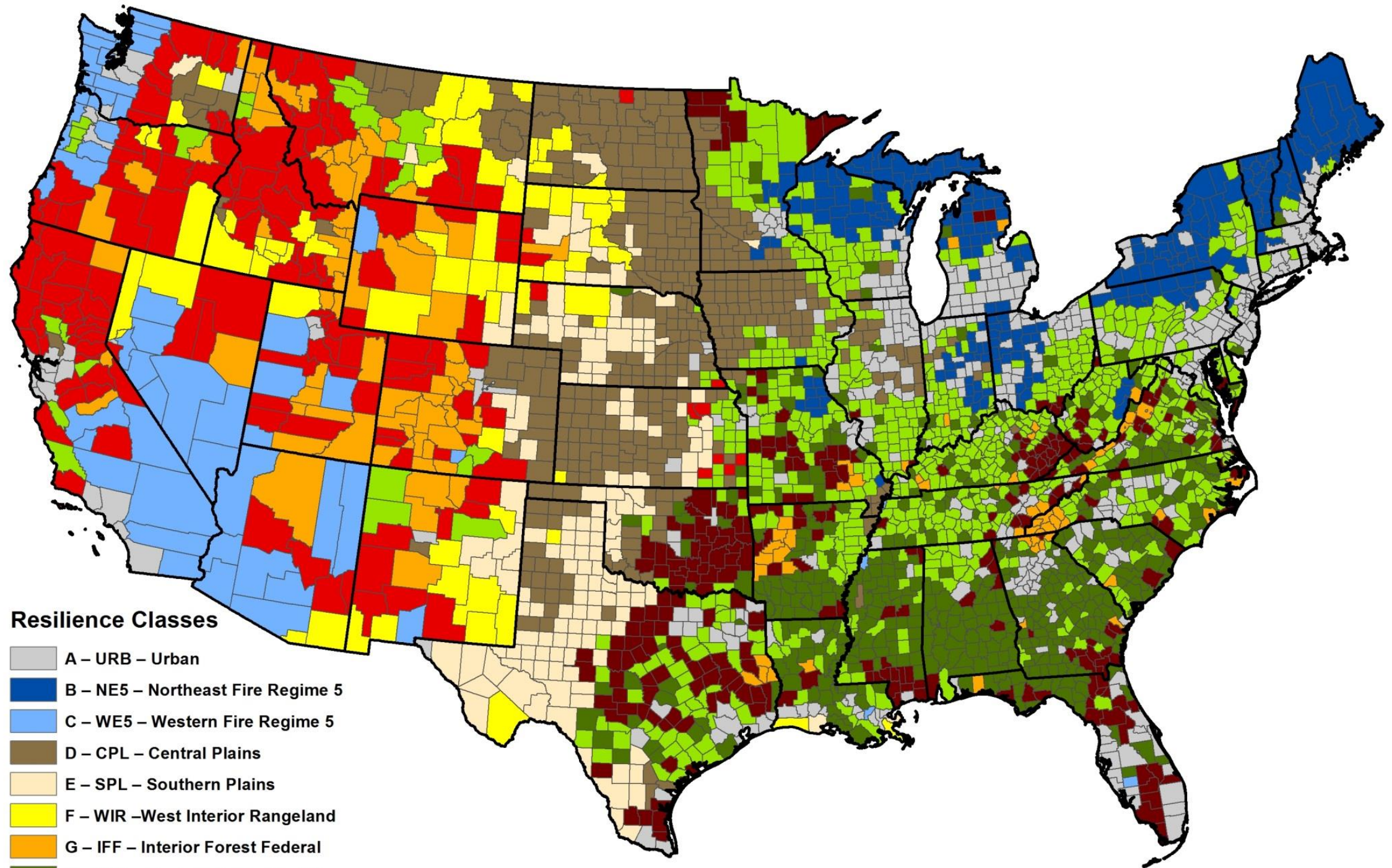
144.3 - 5,787.5

Exploration of Data and Options

- Use county-level data and various models to identify commonalities and geographical differences among counties.
- Classify counties into subsets that share common characteristics relative to the issues being examined.
- Suggest management options tailored to each group or class of counties.

Classification tree for landscape resiliency

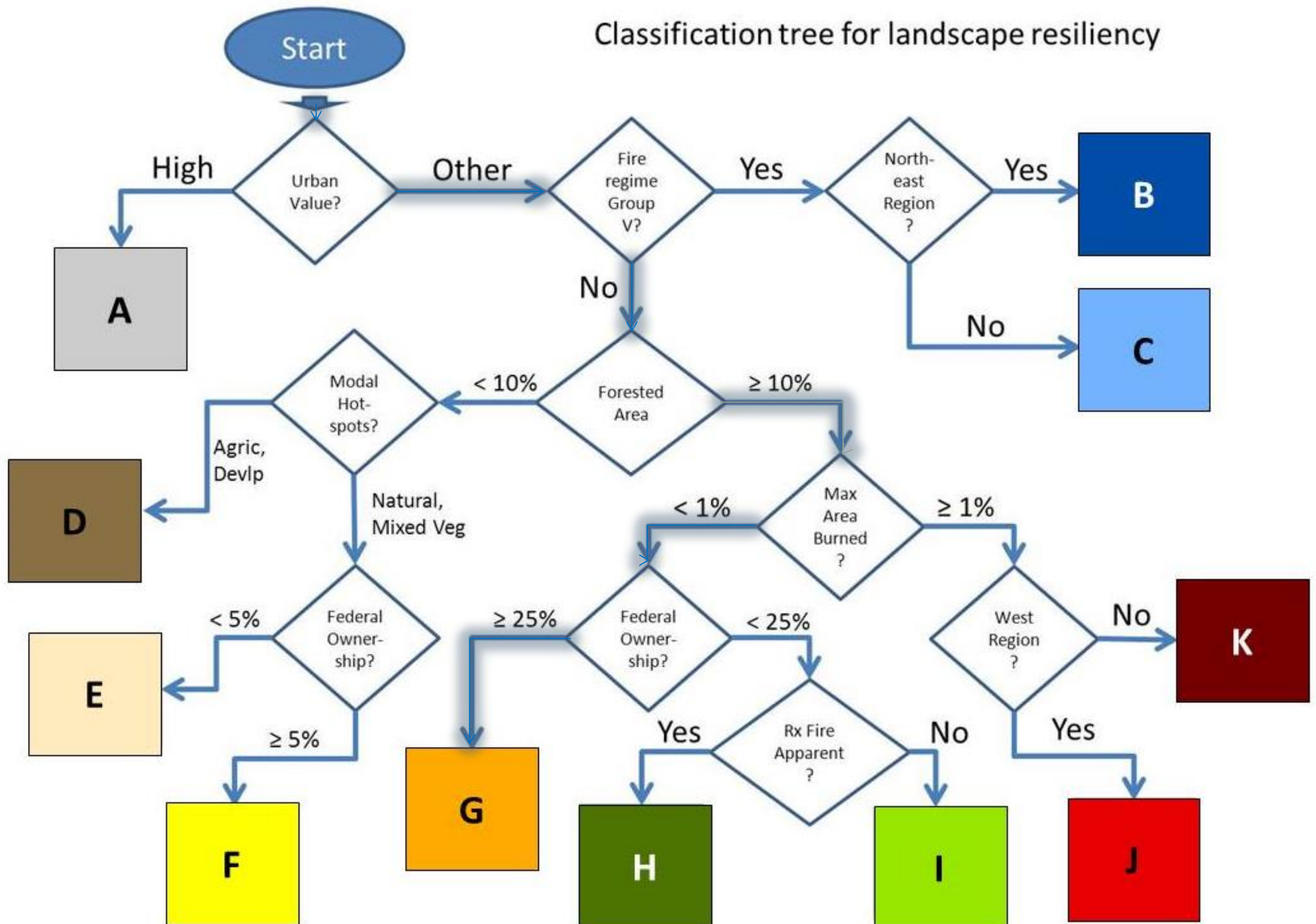




Resilience Classes

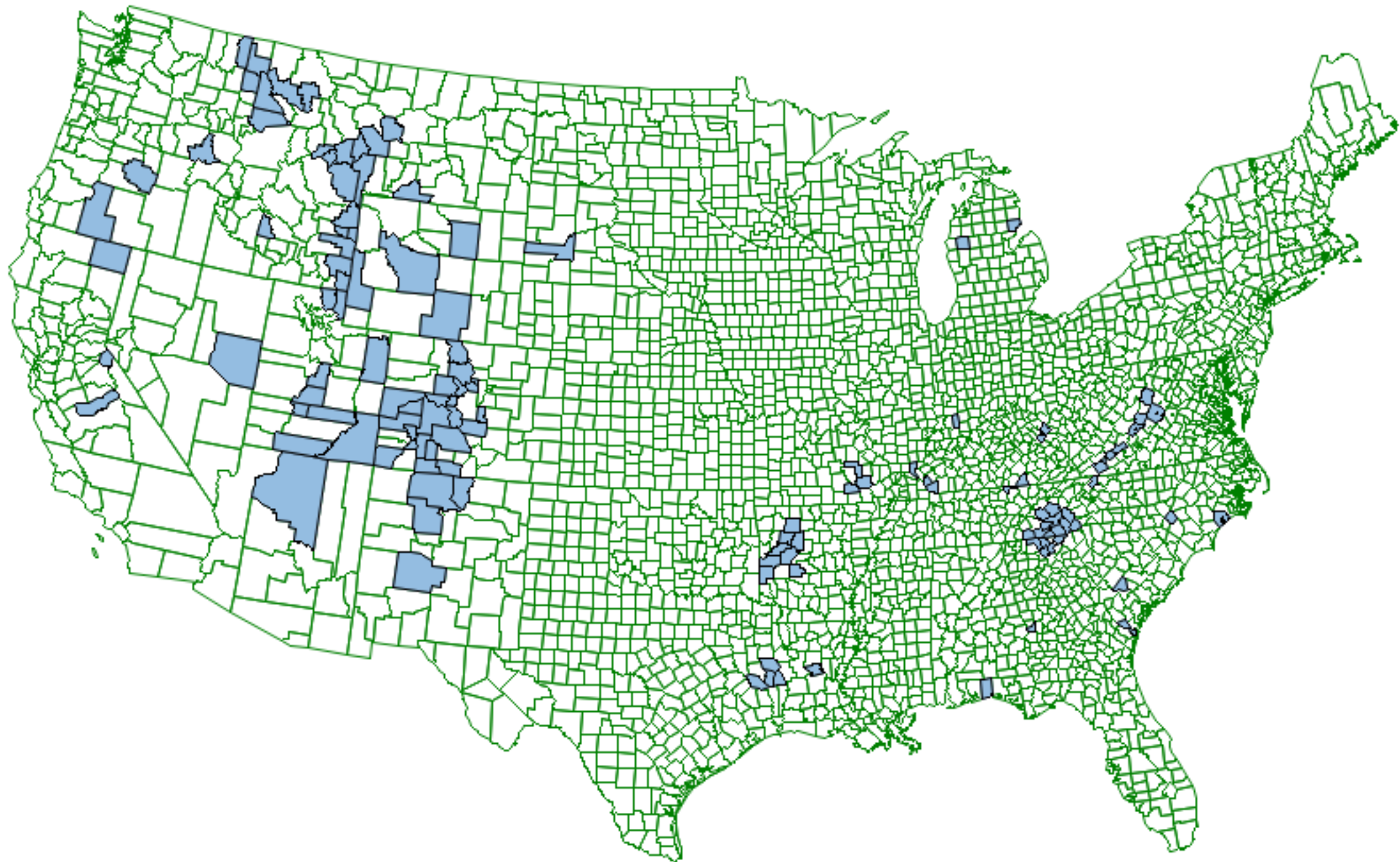
- A - URB - Urban
- B - NE5 - Northeast Fire Regime 5
- C - WE5 - Western Fire Regime 5
- D - CPL - Central Plains
- E - SPL - Southern Plains
- F - WIR - West Interior Rangeland
- G - IFF - Interior Forest Federal
- H - EPF - Eastern Prescribed Fire
- I - ENP - Eastern Non-Prescribed Fire Forest
- J - WIF - Western Interior Forest
- K - EIF - Eastern Interior Forest

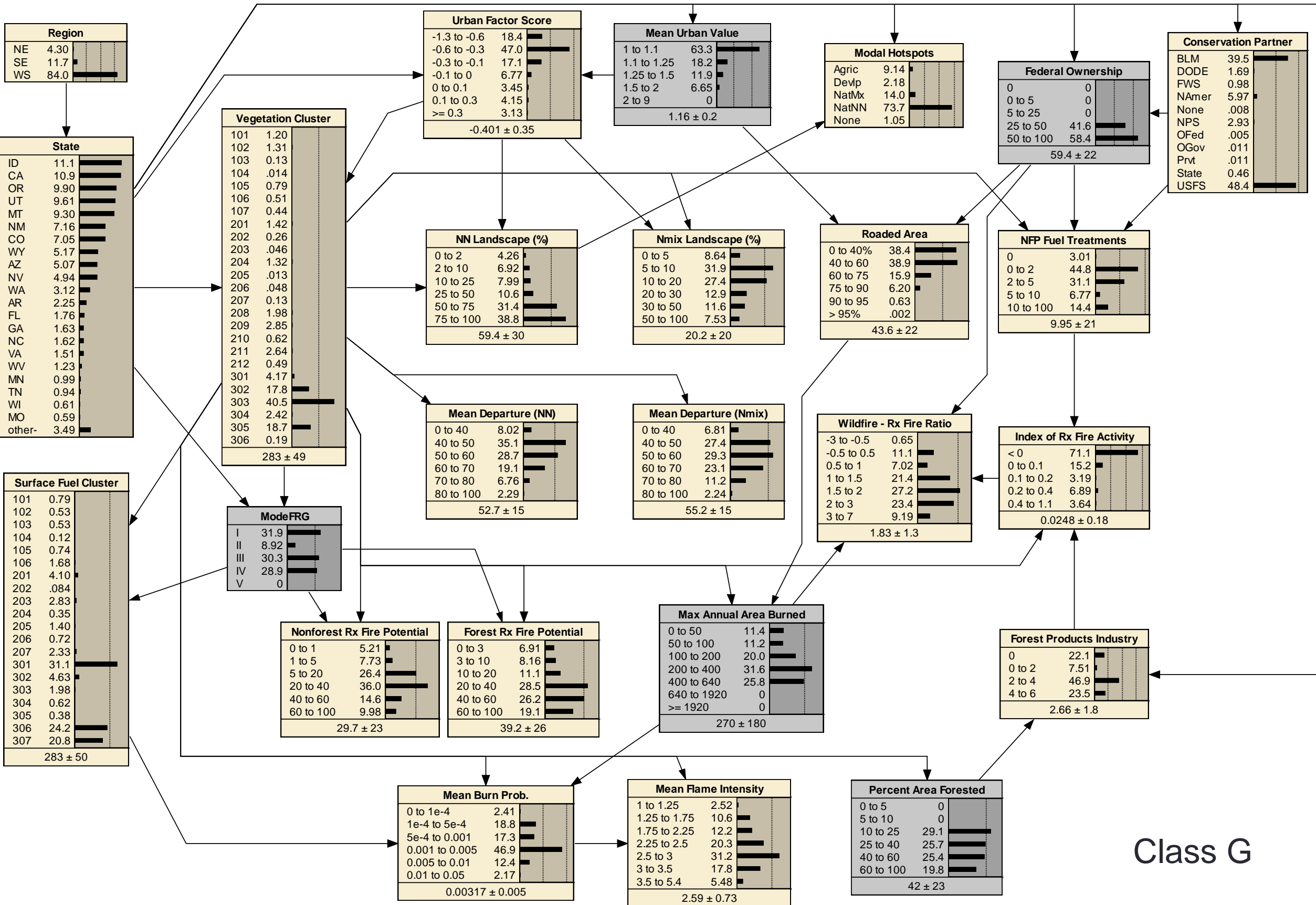
Classification tree for landscape resiliency



Classification for Landscape Resiliency

resilclass=G



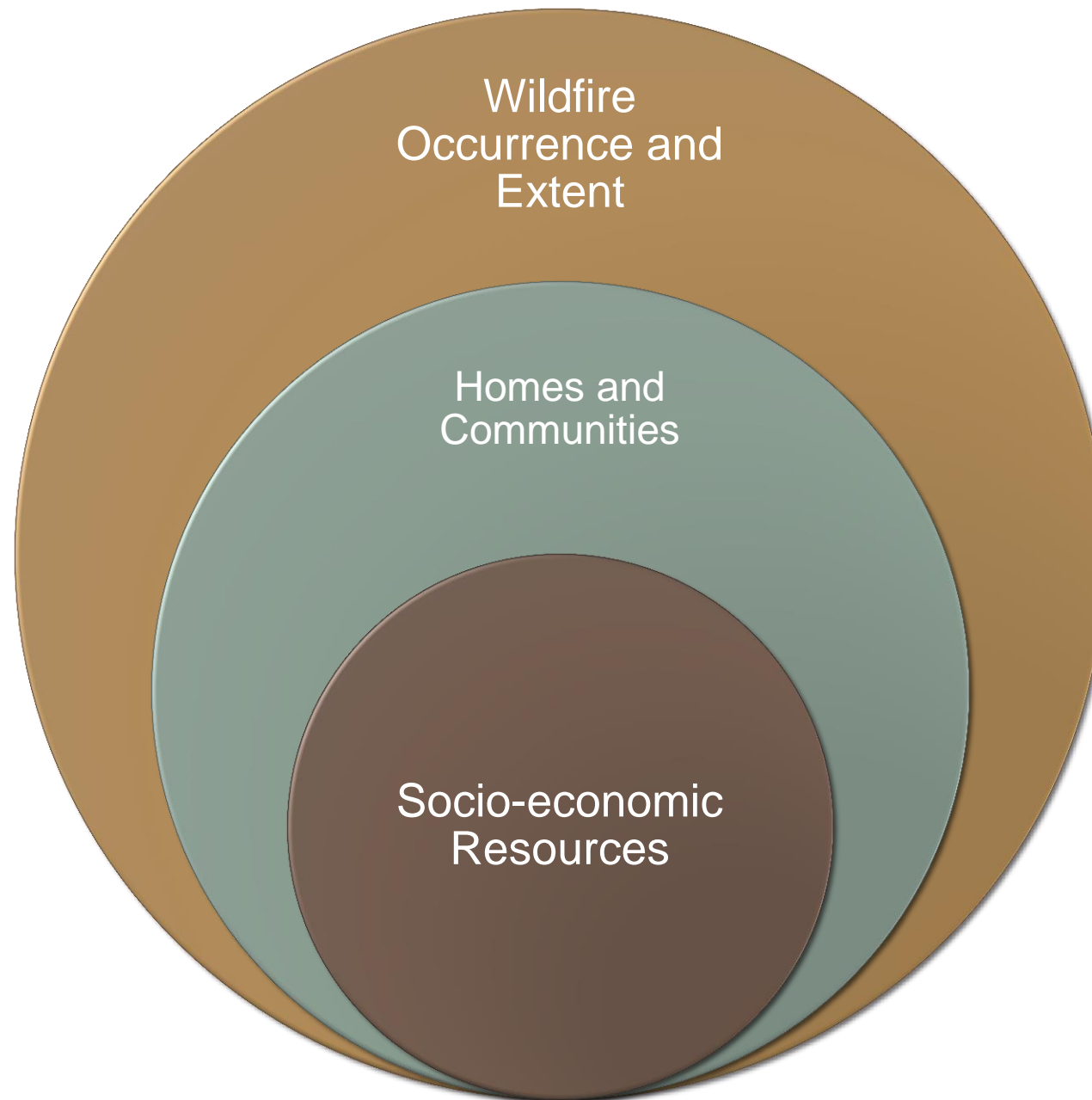


Class G

Observations on Class “G”

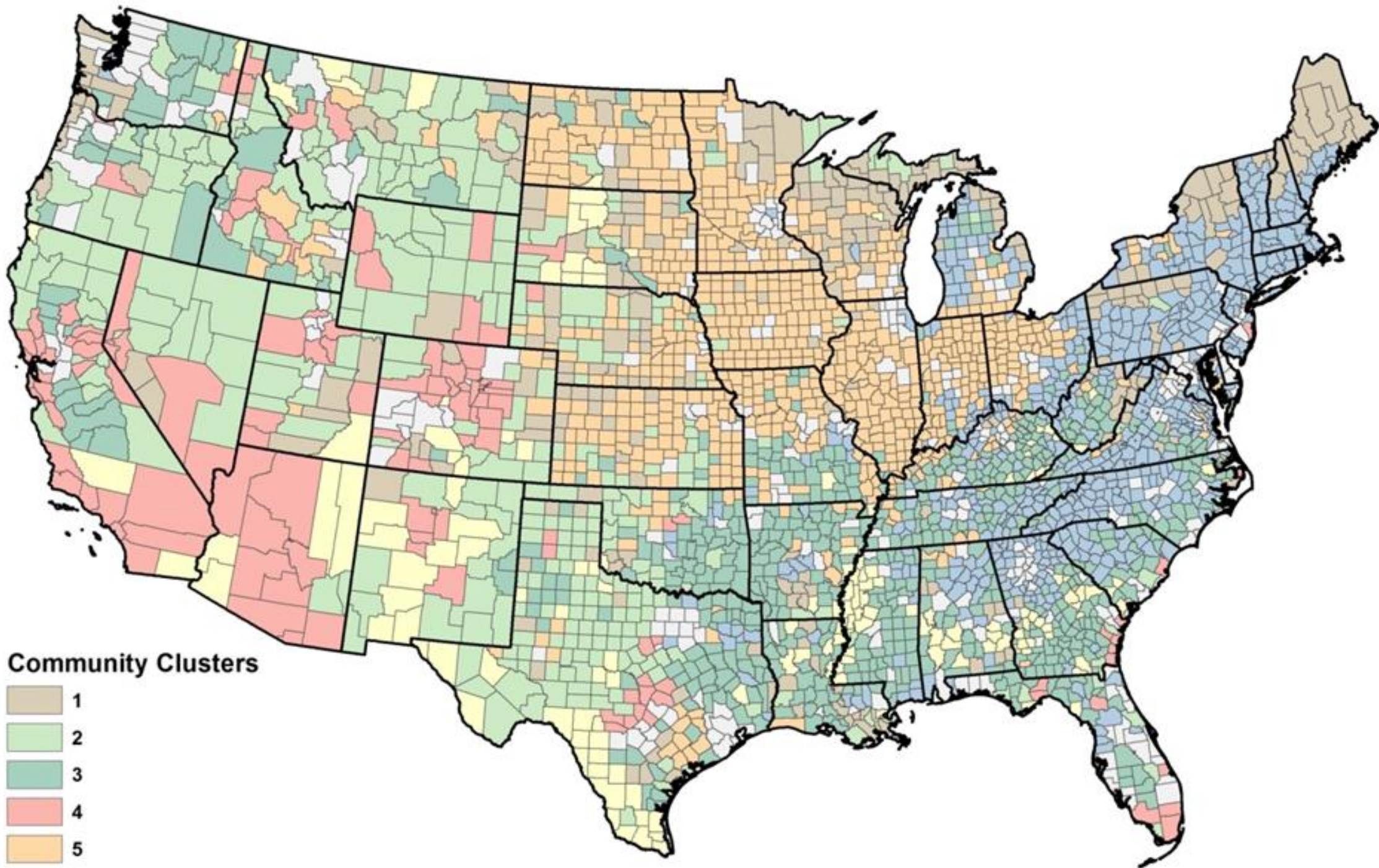
- General picture is one of large, relatively intact ecological systems with moderate wildfire potential
- Similar in many respects to Classes J and K, which suggests potential for large fires
- Large Federal presence suggests opportunities for increased prescribed fire use or beneficial use of natural ignitions in both forests and rangelands
- Ultimately need to consider other issues as well

Basic Conceptual Model: Risk results from the intersection of wildfires, homes and communities, and socioeconomic resources.



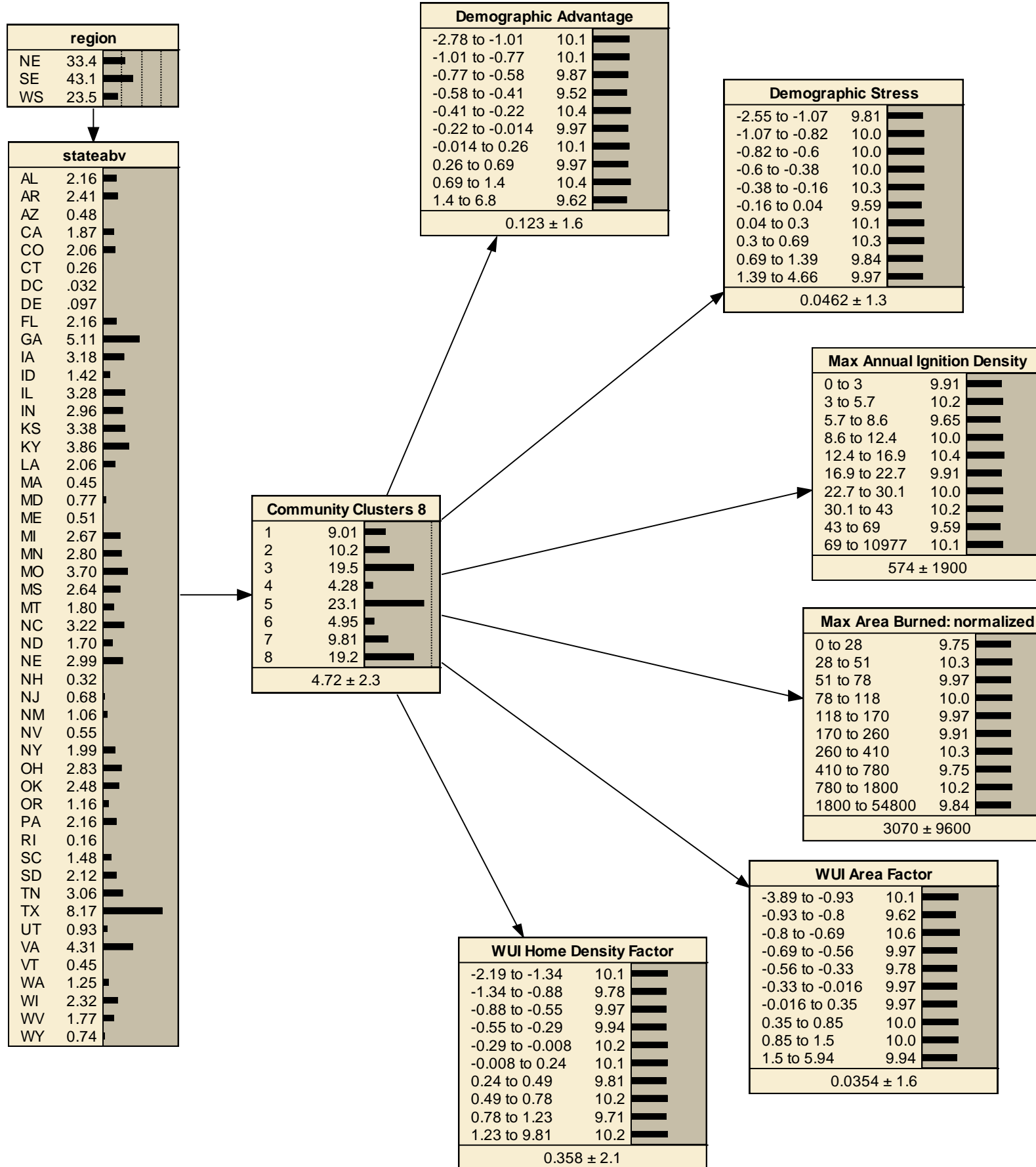
Process is to group counties into classes with similar characteristics use statistical cluster analysis

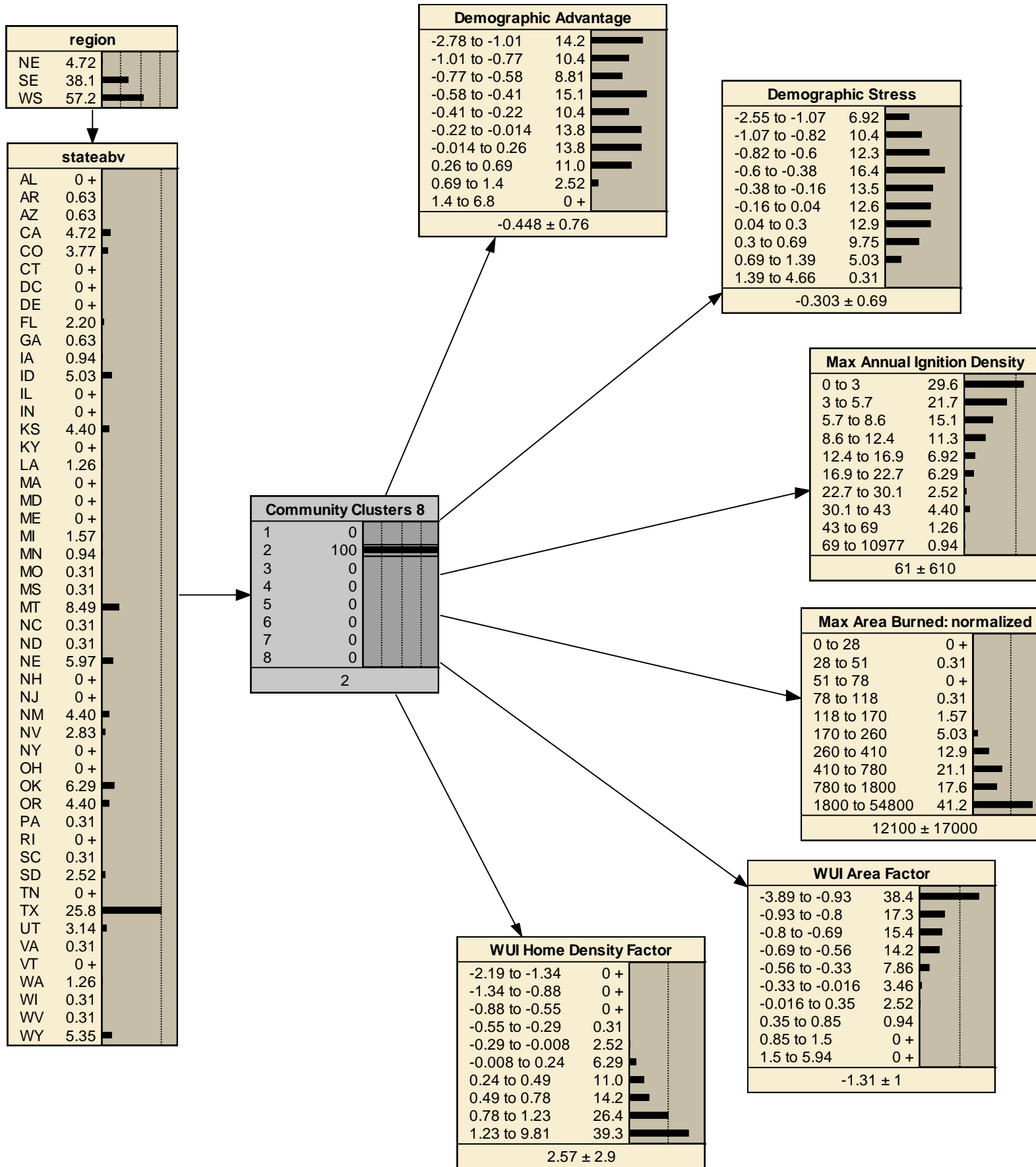
- Begin with six variables:
 - Ignition density (max annual fires per unit area)
 - Area burned (max annual area burned, normalized)
 - WUI Area Factor Score
 - WUI Home Density factor score
 - Demographic Advantage factor score
 - Demographic Stress factor score
- Cluster counties into eight “community clusters” using statistical methods



Community Clusters

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8



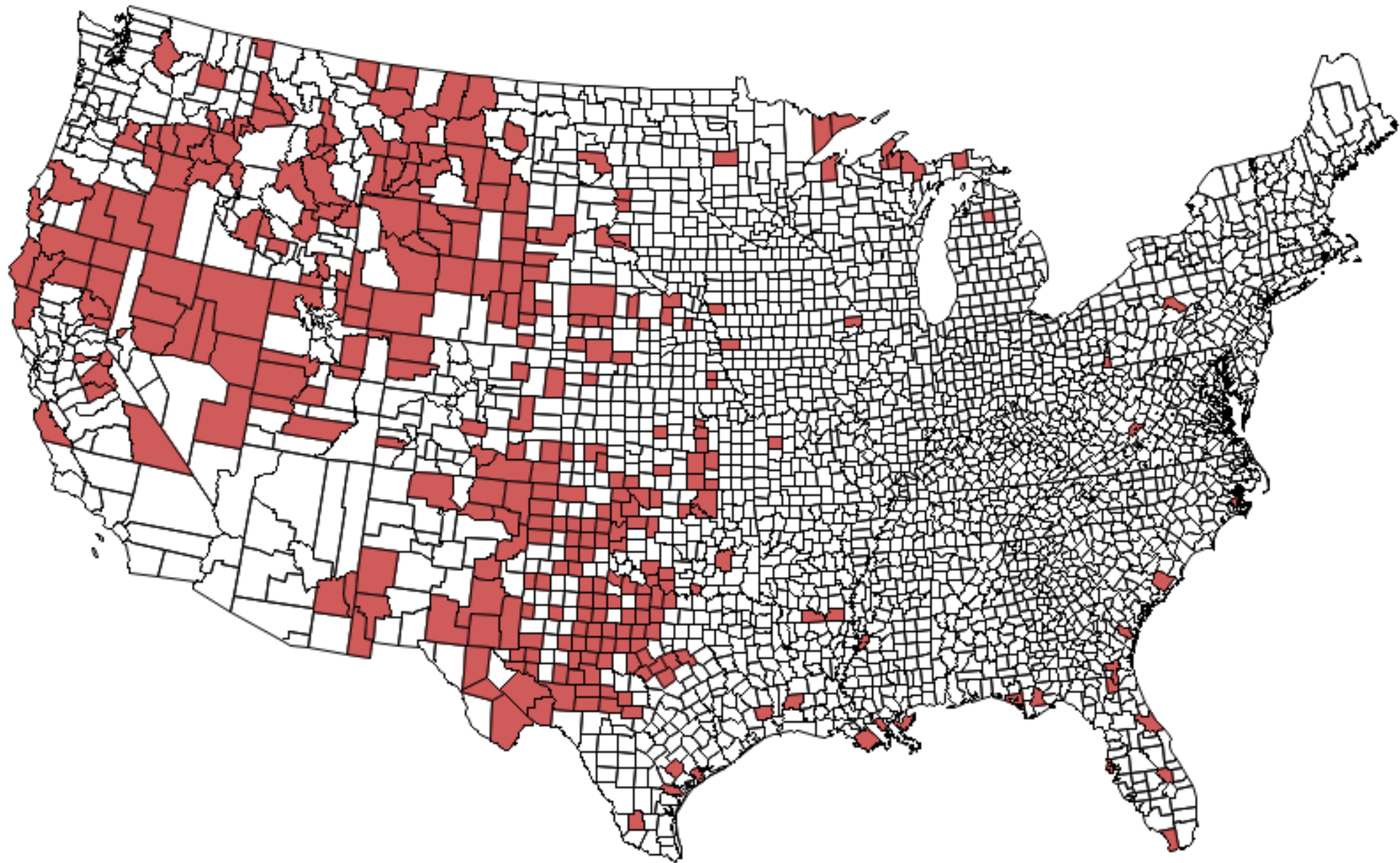


Community Cluster "2"

- Lacking highest levels of demographic stress or advantage
- Low ignition density coupled with high area burned
- Relatively low WUI footprint coupled with high home density within WUI

Community Clusters

Cluster=2

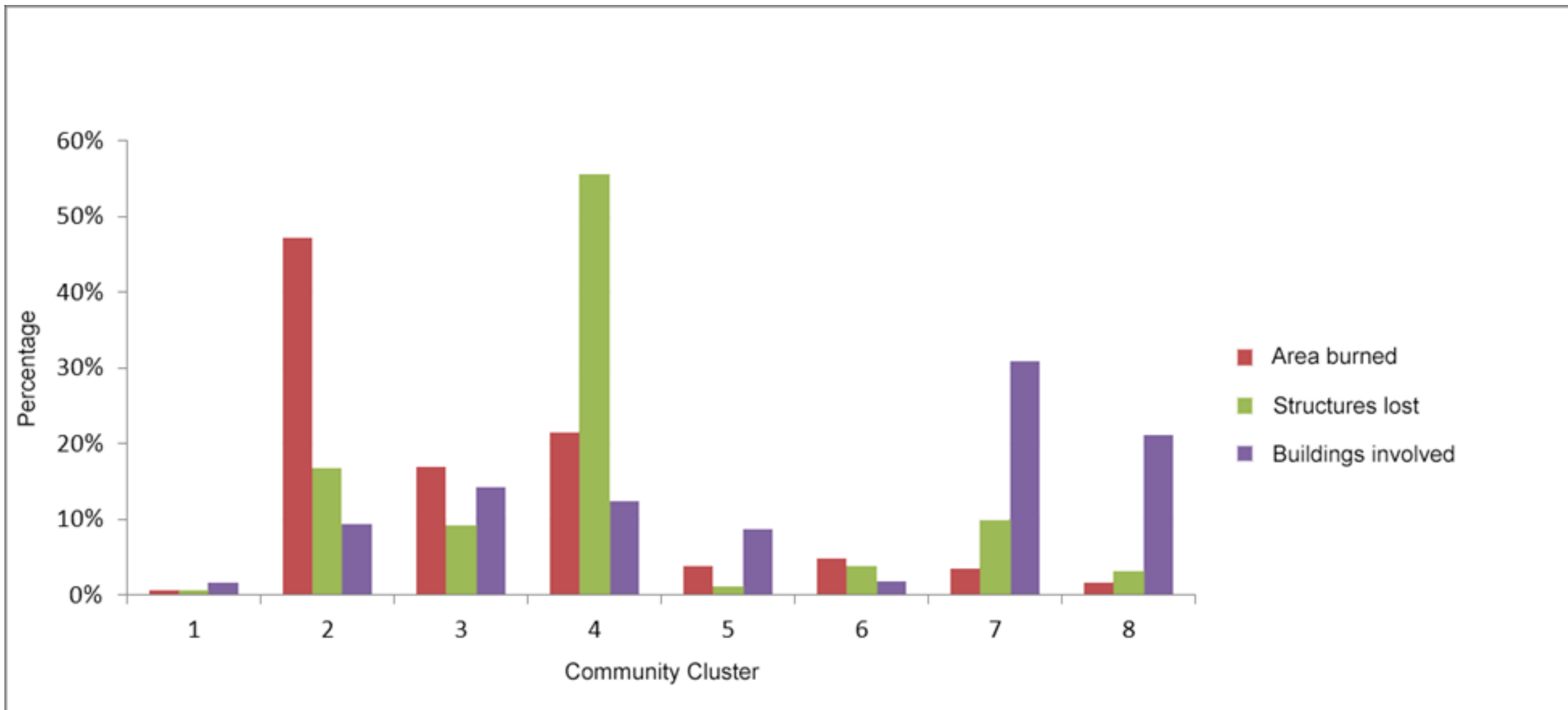


Cluster 1 2 3 4 5 6 7 8

Observations on Community Cluster “2”

- Most prominent risk factor appears to be large area burned relative to ignition density
 - Need to examine causal factors (e.g., biophysical setting or response capacity)
- Low WUI footprint coupled with high home densities highlight need for cooperative community-level planning
- Need to examine role of larger land owners/managers

Using Community Clusters to Explore Differences in Home Exposure



Intersection of Community Clusters with Landscape Resiliency Classes

| Resiliency Classes | Community Clusters | | | | | | | | Grand Total |
|--------------------|--------------------|------------|------------|------------|------------|------------|------------|------------|-------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| A | 8 | 3 | 31 | 30 | 71 | 4 | 129 | 194 | 470 |
| B | 68 | 5 | 6 | | 78 | 1 | 6 | 56 | 220 |
| C | 15 | 5 | 6 | 12 | | 9 | 7 | | 54 |
| D | 56 | 38 | 29 | 2 | 265 | 5 | 14 | | 409 |
| E | 22 | 76 | 7 | 3 | 28 | 22 | 1 | | 159 |
| F | 2 | 32 | 6 | 8 | 12 | 7 | 1 | | 68 |
| G | 18 | 24 | 28 | 12 | 4 | 8 | 20 | 17 | 131 |
| H | 29 | 8 | 189 | 8 | 30 | 54 | 42 | 99 | 459 |
| I | 62 | 18 | 145 | 7 | 207 | 24 | 60 | 192 | 715 |
| J | | 69 | 24 | 38 | 7 | 4 | 8 | | 150 |
| K | | 40 | 135 | 13 | 15 | 16 | 17 | 38 | 274 |
| Grand Total | 280 | 318 | 606 | 133 | 717 | 154 | 305 | 596 | 3109 |

Intersection of Community Clusters with Landscape Resiliency Classes

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2G WDHF / IFF

Community Cluster.....2-WDHF-WUI Density, High Fire

Resiliency Class.....G-IFF- Interior Forest Federal

Description

These are primarily USDA Forest Service and Bureau of Land Management lands in the forested and mixed landscapes of the Western United States. These areas are located north of Santa Fe, NM; Richfield, UT; Ely, NV; BLM land west of Pueblo, CO; Northeast California and southern Oregon (Altamont); Northeast Oregon and Northern Idaho; and the tribal and Forest Service lands of Northwest Wyoming.

These counties are characterized by a large landscape with a small group of communities. Fire occurrence is likely, so if active fire management is to be applied, this area would be a logical candidate for both wildland fire use and prescribed fire. There are some localized conflicts with communities, but other areas should be easier to implement.

In order to avoid larger, destructive fires, non-fire treatments should be applied as a precursor to manage fire. Strategic fuel breaks for a buffer are important where communities are located, as well as instituting new building codes for new construction.

Options

- 1A) Use Prescribed Fire on a landscape scale where it is already being used.
- 1B) Use Prescribed Fire on a landscape scale where it is currently underutilized.
- 1C) Consider Prescribed Fire, but on a limited basis.
- 2A) Wildland fire use in forested landscapes.
- 3A) Non-fire fuel treatments supported by active timber industry.
- 4) Non-fire fuel treatments are economical as a precursor to managed fire.
- 6A) Home defensive actions
- 6B) Home defensive actions, active planning and installation of buffers to protect communities
- 7B) Building and construction codes, outside boundaries.
- 8) Preparedness for campaign fires (high costs)

Summary sheets have been prepared for each combination of community cluster and resiliency class

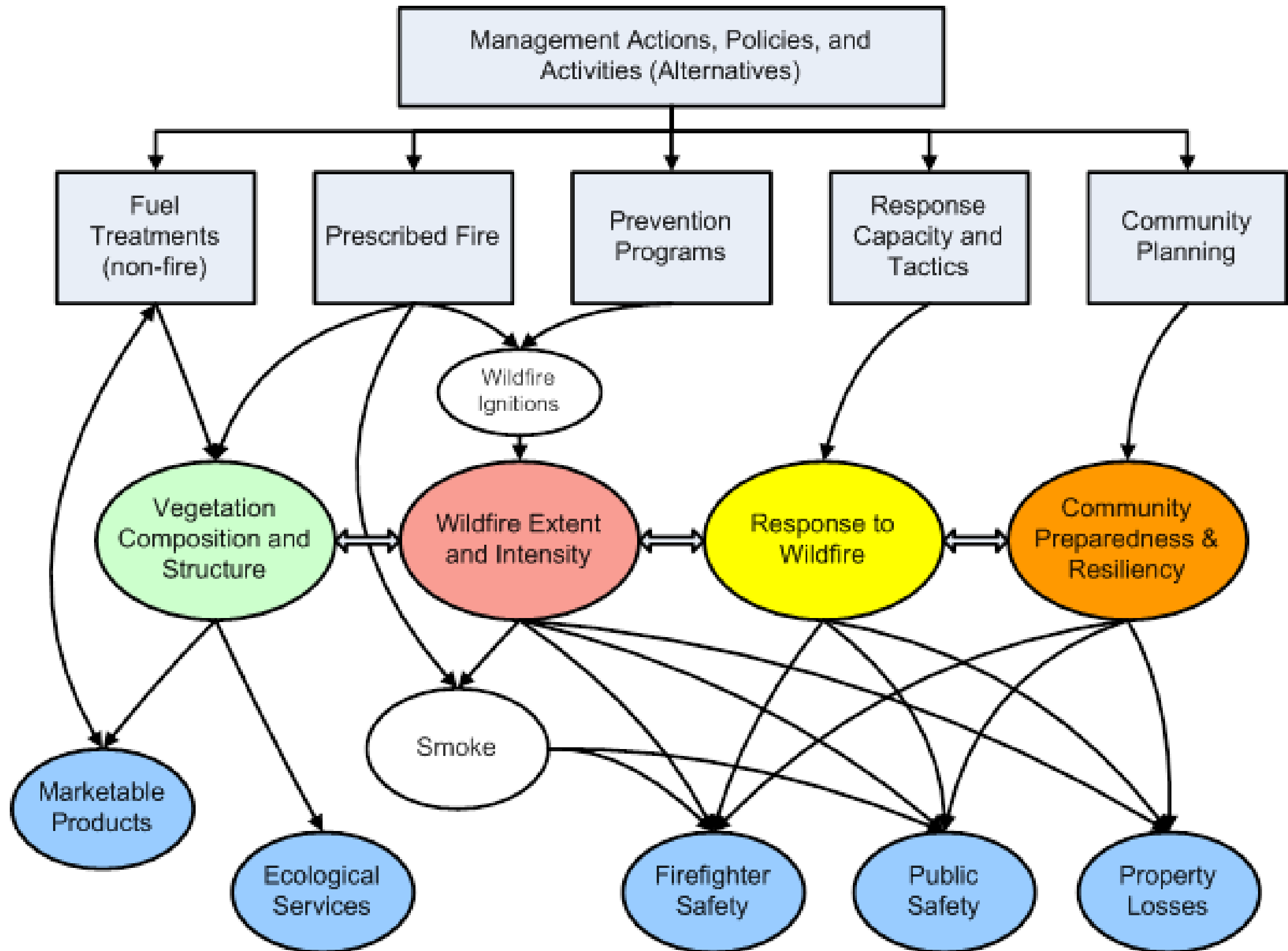


“Policy options” are being broadly interpreted as strategic direction that would lead to greater or less emphasis on various mixes of management actions in different contexts and locations.

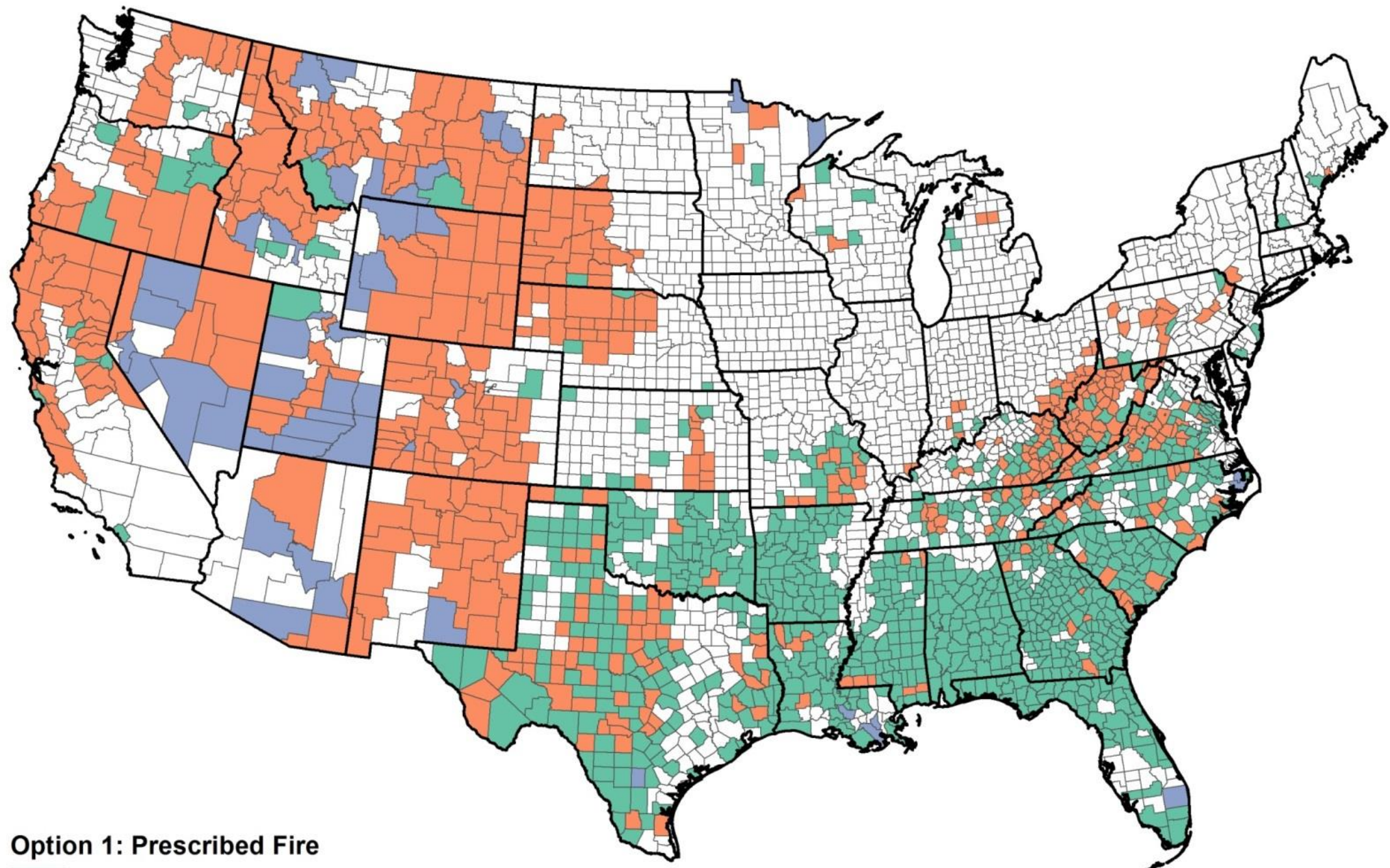
Options have been divided into six general classes:

- Prescribed Fire
- Managing Wildfire for Multiple Benefits
- Fuel Treatment other than Rx Fire
- Managing Ignitions
- Home and Community Actions
- Response

Options are not mutually exclusive, but can (and should) be combined for greater efficiency

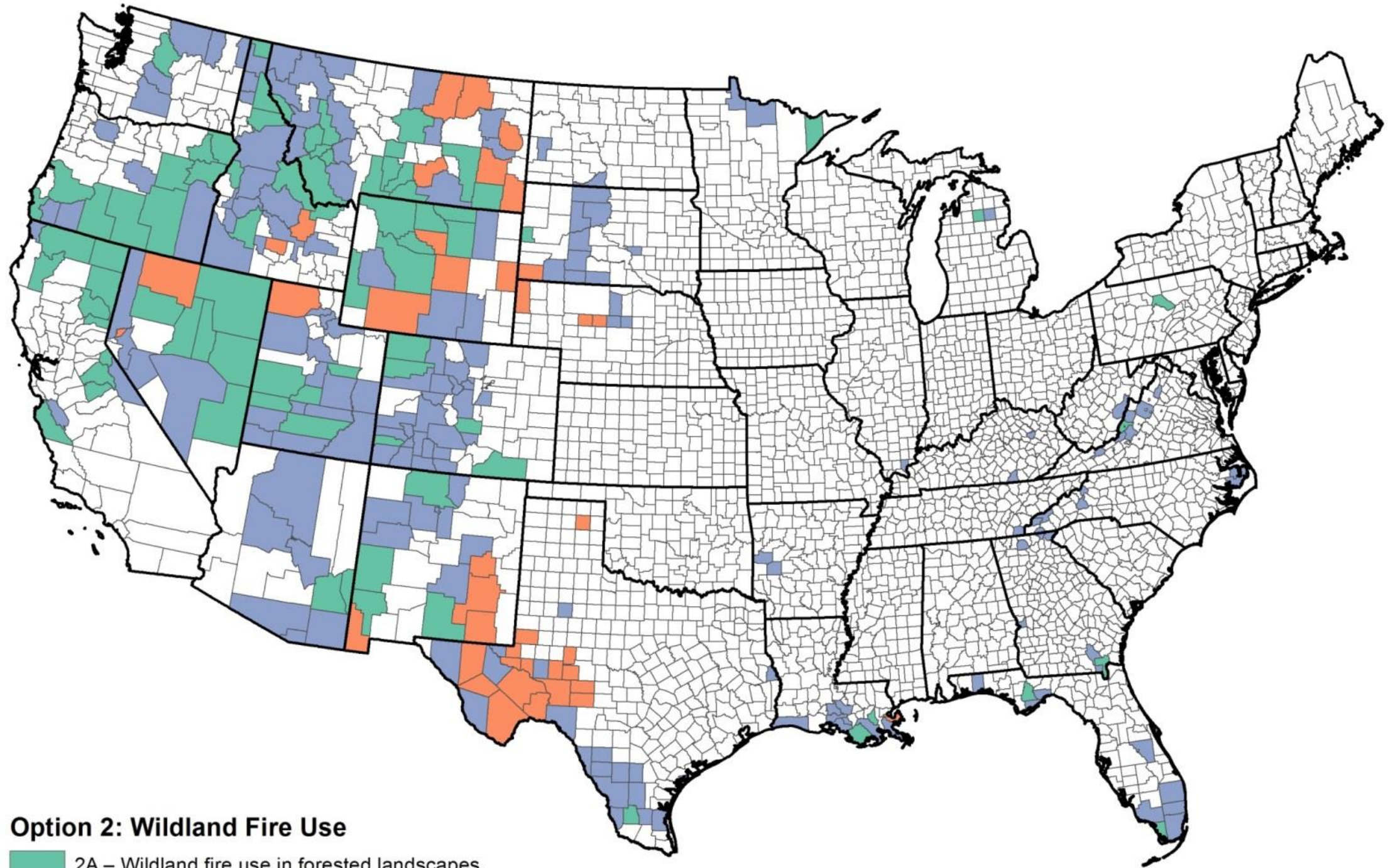


| Theme | Option | Description |
|--|--------|---|
| Prescribed Fire | 1A | Expand or maintain programs in areas of current use |
| | 1B | Expand programs into areas where use is currently lacking |
| | 1C | Use prescribed fire on a limited basis |
| Managing Wildfire for Multiple Benefits | 2A | Apply tactic in forested systems |
| | 2B | Apply tactic in non-forested systems |
| | 2C | Apply tactic, but with awareness of community risk |
| Fuel Treatment other than Rx Fire | 3A | Treatment opportunities supported by forest products industry |
| | 3B | Non-forest areas with opportunity for treatment |
| | 3C | Treatment opportunities limited by economic markets |
| | 4 | Treatments are economical as a precursor to prescribed fire |
| Managing Ignitions | 5A | Reduce accidental human-caused ignitions |
| | 5B | Reduce human-caused incendiary ignitions |
| Home and Community Actions | 6A | Focus on home defensive actions |
| | 6B | Focus on combination of home and community actions |
| | 7A | Adjust building and construction codes, municipal areas |
| | 7B | Adjust building and construction codes, non-municipal areas |
| Response | 8 | Prepare for large, long-duration wildfires |
| | 9 | Protect structures and treat landscape fuels |
| | 10 | Protect structures and target prevention of ignitions |



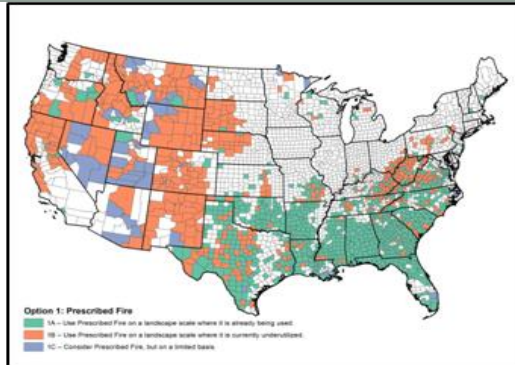
Option 1: Prescribed Fire

- 1A – Use Prescribed Fire on a landscape scale where it is already being used.
- 1B – Use Prescribed Fire on a landscape scale where it is currently underutilized.
- 1C – Consider Prescribed Fire, but on a limited basis.

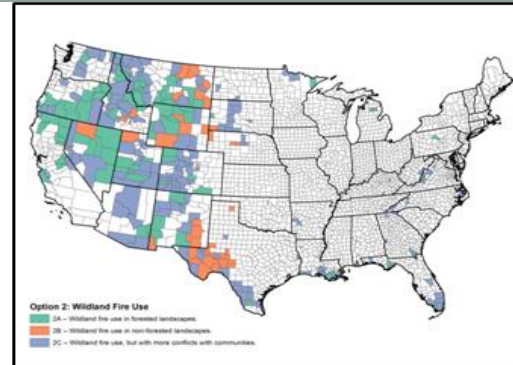


Option 2: Wildland Fire Use

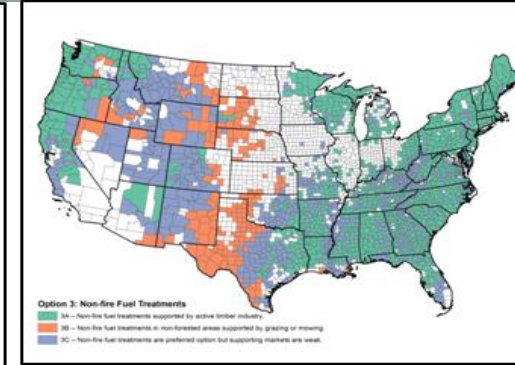
- 2A – Wildland fire use in forested landscapes.
- 2B – Wildland fire use in non-forested landscapes.
- 2C – Wildland fire use, but with more conflicts with communities.



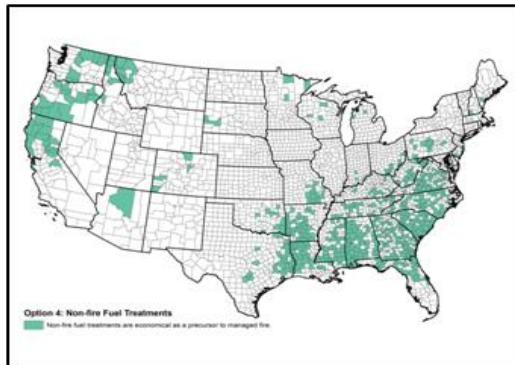
1. Prescribed Fire Use



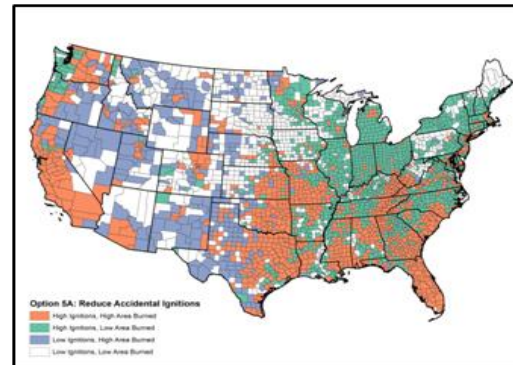
2. Wildland Fire Use



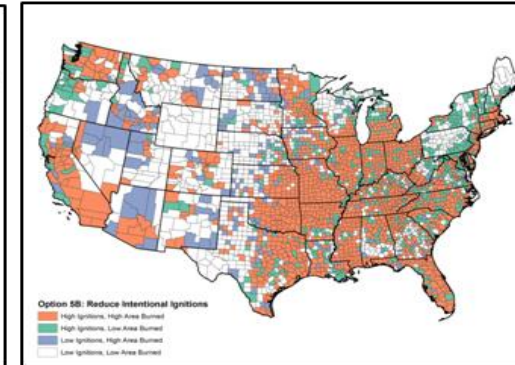
3. Non-fire Fuel Treatments



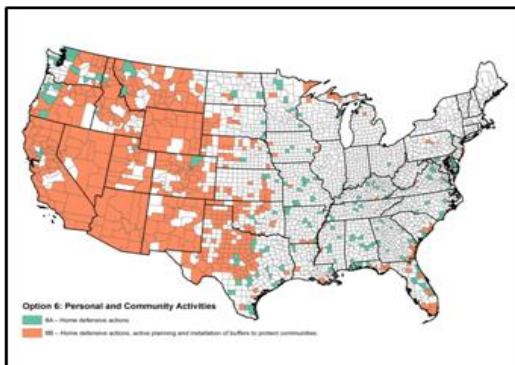
4. Non-fire as a Precursor to Fire



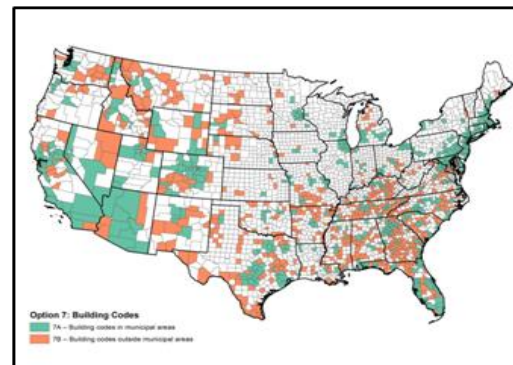
5A. Reduce Accidental Ignitions



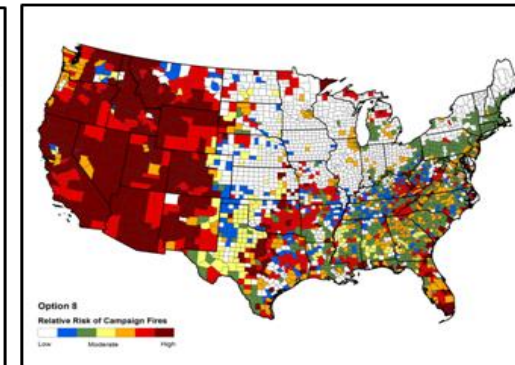
5b. Reduce Intentional Ignitions



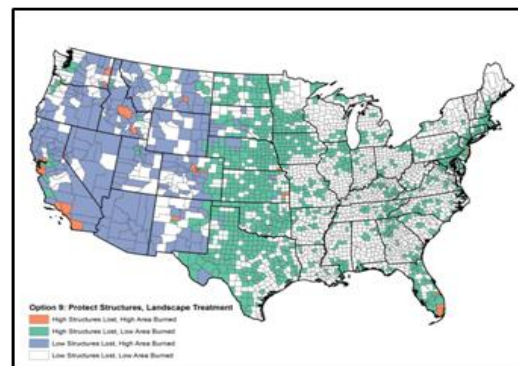
6. Community Protection and Buffers



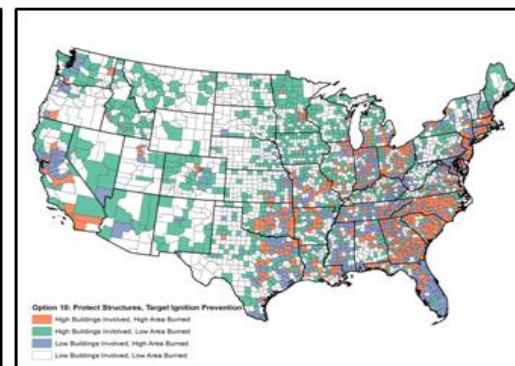
7. Building Codes



8. Preparedness for Campaign Fires

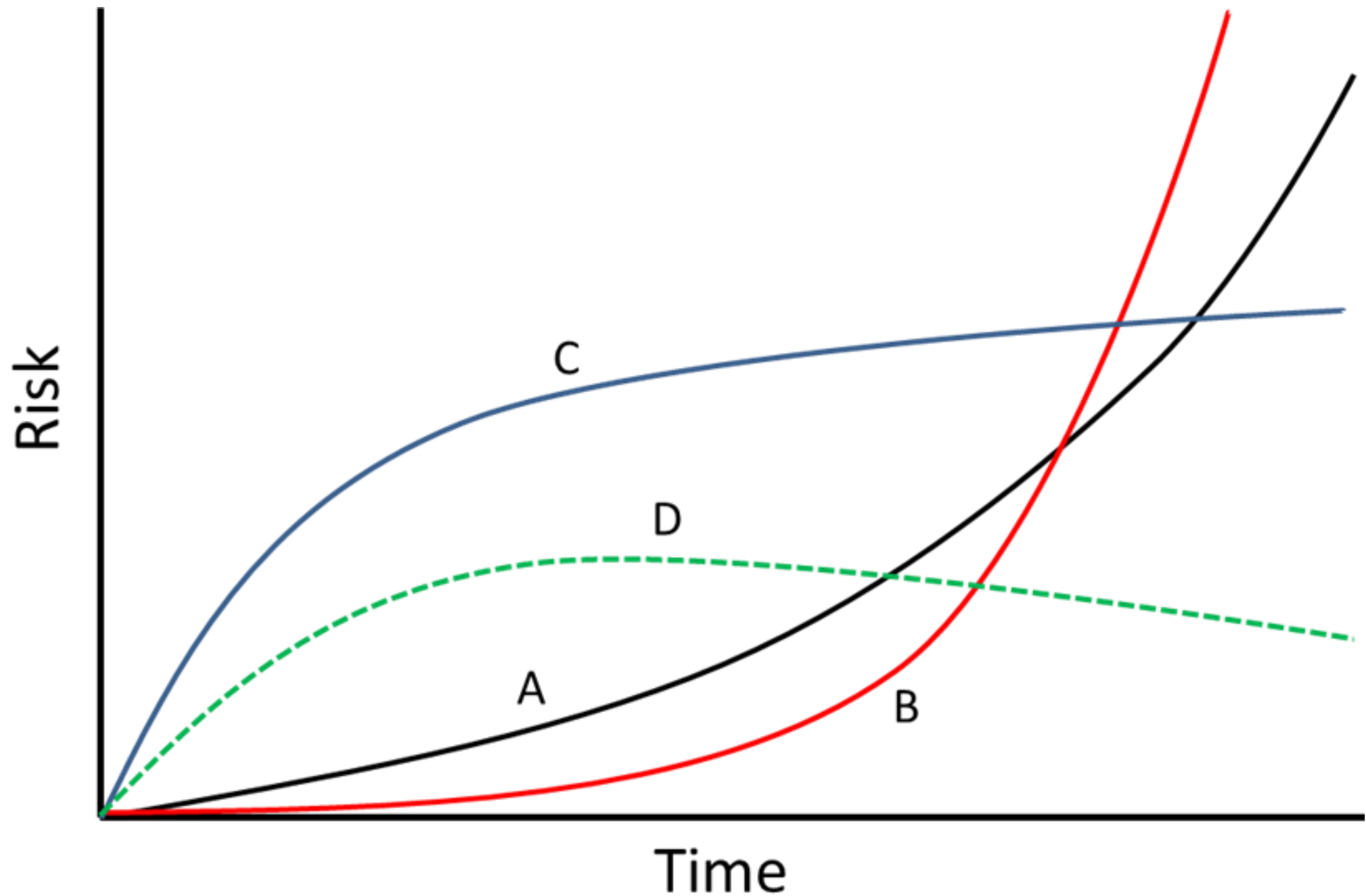


9. Protect Structures and Apply Landscape Treatments



10. Protect Structures and Target Ignition Prevention

Hypothetical Risk Management Scenarios



Conclusions

- Lots of Data and Information to work with; lots to share
- Two-dimensional classification system allows us to view counties from a combined environmental and social perspective
- Common narratives allow a level of generalization necessary for national or regional prioritization
- Our examination of broad policy options helps inform discussions leading to a cohesive national strategy
- Next steps are up to larger Cohesive Strategy Governance

Questions?

For further information, visit <http://www.forestsandrangelands.gov>

